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THE IRON TRADE REVIEW

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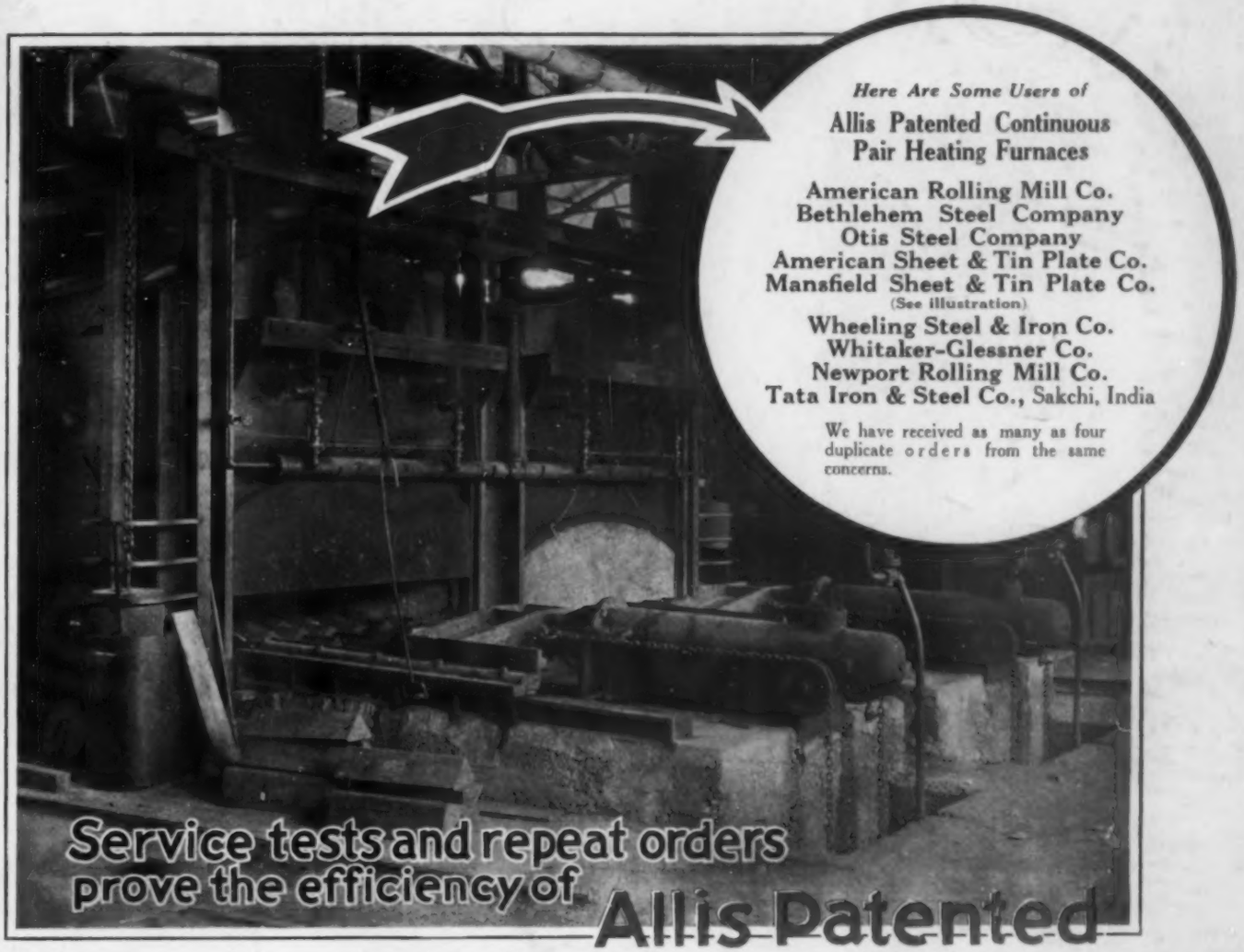

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(See illustration)
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Advertisers' Index, pages 142-143. Contents, page 63. "Where-to-Buy," page 74.
Engineering Directory, pages 110-111. Classified Advertisements, pages 120-141.

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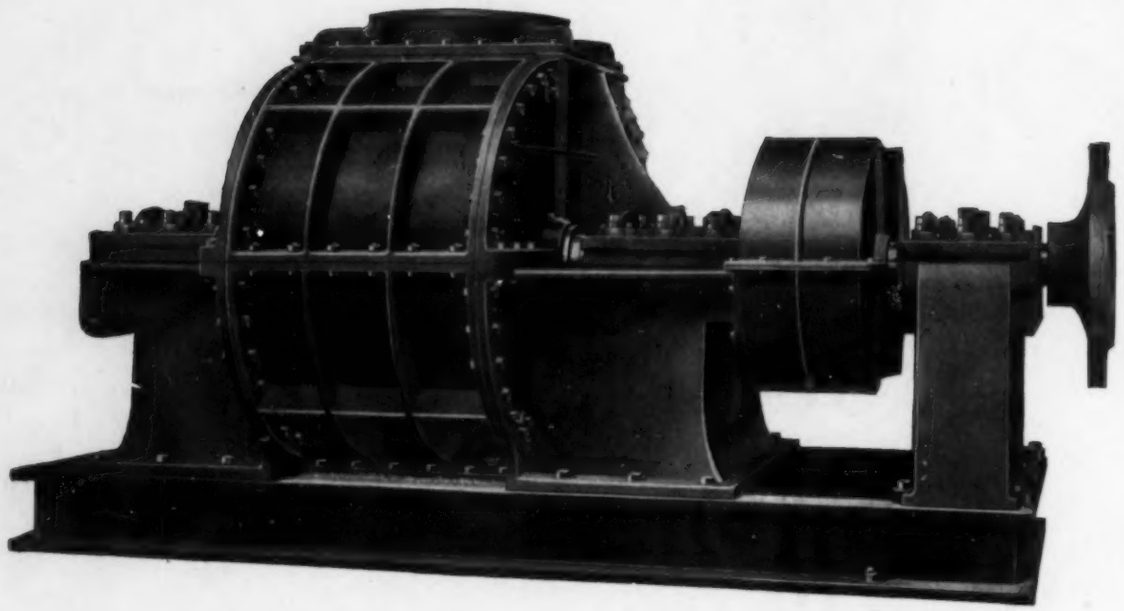

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THE IRON TRADE REVIEW

Vol. LXII Cleveland, January 10, 1918 *No. 2*

Car Congestion Stagnates Industry

Iron and Steel Plants Experience Worst Traffic Conditions in Their History and Much Production is Lost—Embargoes Tie Up Business on All Sides—Outlook is Not Promising

STAGNATION of shipping is having a paralyzing effect in all directions on the iron and steel industry. The climax of a combination of inadequate supplies of cars and motive power, of coal and other manufacturing supplies, has been reached during the past week. Conditions are pronounced to be the worst in the history of the industry. As a result, scores of mills and furnaces have been forced down and the loss of production has mounted far into the thousands of tons. The outlook for an immediate improvement is not promising, though strenuous efforts are being made to restore something like normal conditions. Many plants rapidly are filling their storage space and unless they are able to dispatch shipments, their speedy shutdown will be necessitated.

Embargoes Bar Business

Pittsburgh and its adjacent districts are laboring under a flood of embargoes which has shut off business communication with many parts of the country. One large plant had 1400 loaded cars within its yards awaiting to be moved. In the Connellsville coke region, 5000 loaded cars have been stalled on the tracks the past week. The Carnegie Steel Co. had 24 blast furnaces idle last week and 20 during the present week. The list of idle mills of this and other large producers in the Pittsburgh district has been equally serious. At one plant, only two of 17 mills were operating last week and this has been increased.

The extent of interruptions of blast furnace operations in recent weeks is shown by the December production statistics in pig iron. The output last month was the lowest since August, 1915. During the month, 23 furnaces were blown out and banked. The loss in production, compared with November, was 12 per cent. The December production was 2,886,553 tons, an average of 93,115 tons daily, against 3,198,597 tons in November, a daily average of 106,620 tons. Blast furnaces in Pennsylvania, Ohio and Illinois have been hit hardest, production in those states falling off 250,000 tons from November.

Revised Price Checks Sales

The declaration of the President that all contracts now taken for shipment subsequent to March 31 shall be subject to government prices in effect at the time of delivery has had the effect of checking forward sales in pig iron. Makers see no incentive to add to their bookings for extended delivery. New inquiry, however, remains brisk. Orders for government work are coming out in a heavier way and the largest so far to be placed calls for 36,000 tons of basic for shipment to an Erie, Pa., consumer. The iron is to go into navy castings.

Traffic problems have absorbed all attention of the industry during the past week. General business in finished lines has been relatively quiet. A 30-day extension has been granted by large interests on unspecified tonnage under contracts which were dated to be wound up Jan. 1.

Fixed Price Booklet Ready

A COMPLETE booklet containing all the official prices, differentials and extras fixed by the government on various iron and steel products has been prepared by THE IRON TRADE REVIEW and now is ready for distribution. Subscribers will be furnished with copies on application, without cost. The booklet represents the only complete collection of base prices, differentials and extras determined upon under federal supervision which yet has been arranged or published. All the price data from iron ore to carpet tacks has been grouped and correlated in accordance with the character of the product, and has been indexed alphabetically to allow quick reference. The complete story of price-fixing also is told. The booklet contains approximately 60 pages and is of a size for convenient handling.

The Iron Trade Review

EDITORIAL

Coal and Coke on Trial

MORE complaint as to their inability to buy supplies at the fixed government prices has been raised by consumers of coal and coke than of any other material of the iron and steel industry. This situation is in sharp contrast to that which generally prevails as to mill and furnace products, where buyers have been able to obtain tonnage at the agreed schedules without excessive trouble. Furthermore, the opportunities for obtaining steel at the government prices are improving steadily, subject to whether the material is to be used for an essential product, because order books gradually are being reduced or modified under priority regulation. In bars especially, consumers are able to obtain material with little delay.

A common explanation offered for the absence of coal and coke sales at the government prices is that production largely is taken up by shipments against contracts made before the market was fixed by the President. This is an explanation that scarcely explains numerous incidents which have come to light. Along this line, a letter to THE IRON TRADE REVIEW from an industrial company in the middle west is illuminating. An officer of the company writes:

"The government has fixed the price of Connellsville coke at $6 and $7 per ton and we have requisitioned on our regular concern for coke, receiving the reply they were unable to furnish any coke at this price, but could sell us coke for immediate delivery at $15 per ton. What we want to know is, does the government permit this to be done, and what recourse have we in such a case."

Attempts at profiteering such as this have brought much criticism upon the coal and coke producers. Many of the producers have endeavored honestly to co-operate with the government and to do what the latter has called upon them to do, to the extent that their bona fide obligations would permit. They nevertheless are sharing with their less honorable associates the incubus of discredit through their industry having appeared in an unfavorable light before so many people. The reputable coal and coke producers of the country owe it to themselves to join hands with the government to stamp out such reprehensible acts from which their industry is suffering. If they do not, the government is likely to lay heavy hands upon their business under the complete authority given it by the Lever act. As much was plainly stated by W. S. Blauvelt of the National fuel administration to the coke operators at a general meeting at Connellsville last week. Indictment and arrest of some coal dealers in the Pittsburgh district during the past week may be taken as a sign of the times.

Tools Present Vital War Problem

SERVICEABLE superstructures built on insecure foundations presage a diminished usefulness of the whole. More specifically, putting forth a splendid fighting front of men and money backed by patriotic enthusiasm, but inadequately supported by munitions and ships obviously decreases the effectiveness of these potentialities. Machine tools, for example, which are of vital importance in ship construction as well as in munition-making, need the fostering hand of the government quite as much as destroyer plant work. The country's capacity for making heavy tools has been limited, a tremendous demand has arisen and builders are falling steadily behind in deliveries. Many builders would enlarge their production capacities were they assured of a sufficient volume of orders; others would expand, but for the fact that they are staggering under the burden of overproduction with its attendant tied-up working capital. The latter find it difficult to secure financial backing from banks for business expansion. Handicapped in this way, the machine tool industry is having difficulty in meeting requirements. Governmental financial stimulus, it would seem, would transform into kinetic energy this almost incommensurable potential force.

Labor Faces Stern Duty

ON all sides the cry is raised that efficiency in conservation, production, transportation, distribution, etc., will win the war. All this when summed up, hinges upon the one brief statement that labor can, if it will, bring victory. After months of intensive training, our army will be numerically sufficient to work an appreciable influence in the test of arms. If such an elaborate organization is necessary to make soldiers that represent possibly 2 per cent of the population, of much greater necessity is the training or organization of the remaining 98 per cent, the larger portion of which is labor.

Since the war began, important strikes have occurred in 34 of the 48 states of this country, all of which have been an incalculable aid to the kaiser. In New York state, from Oct. 1, 1915, to June 30, 1916, nine months, 328 strikes were reported. These

The Iron Trade Review.

EDITORIAL

involved 253,954 persons and represented an aggregate loss of 9,580,601 working days. Since the President's declaration of war, United States shipyards because of strikes and labor disputes have lost 536,992 working days, the equivalent of the labor of 20,000 men for a month. All the unsettling war reports do not come from across the ocean. It follows from the statistics of strikes and other disturbances that labor is not doing its full part in this crisis, since without its complete and whole-souled effort, the proper measure of support and co-operation will not be given the men at the front. Labor must realize that profiteering for wages must have no place in its bill of duty and that by interrupting production, it will not only be aiding the kaiser, but will be fighting its own sons and the sons of its friends, who have volunteered to lay down their lives if need be to bring permanent peace.

Finally, this is a war of labor, by labor, for labor and against labor and as soon as England's example of a truce between capital and labor for the duration of the war is followed here, the sooner will most effective results be obtained.

Difficulty in Fixing Nonessentials

DETERMINATION of what is a nonessential product promises to be one of the hardest tasks the government has undertaken in its war program. It is easy to think the other fellow's business is not essential, but that one's own cannot be dispensed with.

It seems like harsh treatment for the government to close up an industry which has been built up by patient endeavor and now represents the livelihood of its owner, stockholders, and employes. But another idea comes into the question. The billboards have carried the interrogation "Shall we be more tender with our dollars than our sons?" After all, is it more of a hardship for some to lose their business profits than for others to lose their lives or health or limbs? Men are giving up all they have, far more than financial considerations, to fight at the front.

Probably the problem will work itself out in a natural way by the gradual elimination of the really unessential industries through their inability to proceed as they have done in the past. Demands for the production of articles the need for which is imperative will absorb raw materials and labor until the latter will not be available to other non-war lines of industry. Under these circumstances the so-called nonessential activities may be weeded out without violence to the business structure.

It requires a high degree of patriotism for business to offer itself as a sacrifice, but not so much so as for the individual who goes to fight at the risk of forfeiting his life.

The Alaskan Coal Mining Industry

IN 1916 Alaska mines yielded a mineral output valued at $48,632,138. The output in 1915, greater than that of any previous year, was valued at $32,854,229, making the increase of 1916 almost $16,000,000, nearly 50 per cent. This enormous growth was due in great part to the large tonnage and high price of copper, yet nearly all other minerals were produced in greater quantities than in previous years.

An especial feature of the Alaskan mining industry was the increase in coal production. In 1915 it was 1400 tons, valued at $3300, while in 1916 the output jumped to 12,200 tons, valued at $55,000. While this output is, of course, exceedingly small, it is at least evidence of the stimulated interest which is being taken in this industry. Alaska has never been taken seriously as a coal producer due to the fact probably that in the early days men migrated there obsessed with the sole idea of gathering in sudden riches in gold. Strange to relate, it is the placer gold mining industry which is crying for coal at the present time.

A study of Alaskan coal output for the last 18 years reveals a curious series of increases and decreases. In 1899 the output was 1200 tons and this increased a trifle during each of the three succeeding years. In 1903 and 1904, however, it fell off, only to take a renewed spurt in 1905, which continued and finally culminated in a production of 10,139 tons in 1907. Then the output steadily declined to 1915. In fact no official production figures were published at all in 1914. Up to the year 1914 lignite had been used almost exclusively.

Economic reasons now seem to indicate that the coal mining industry in Alaska will finally come into its own. There are many regions known to contain large quantities of high grade anthracite and bituminous coals. Still more regions contain enormous quantities of lignite. Indications are that a considerable local market can be had easily, for coal imports exceeded 40,000 tons during each of the last three years.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 188

PIG IRON

Bessemer valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern)	$33 furnace base
2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern)	base plus 50c
2.75 to 3.25 silicon (No. 1X, No. 2 soft)	base plus $1.50
Over 3.25 silicon	$34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2+ foundry, N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern, Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos. Lebanon furnace	50.00
Low phos., Pittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern, furnace	43.00

COKE

(At the ovens.)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Pocahontas furnace	6.00
New River foundry	7.00
New River furnace	6.00
Wise county foundry	7.00

FERRO ALLOYS

Ferromanganese delivered	$250.00
Spiegel, 20 per cent fur.	60.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, Pittsburgh	175.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	160.00 to 170.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$47.50
Open hearth, Philadelphia	50.50
Open hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open hearth, Pittsburgh	$51.00
Open hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Philadelphia	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c
Cotton ties, Pitts., Jan.	$2.18

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh, base	3.25c
Angle bars, Chicago, base	3.25c
Standard bessemer rails, mill.	$38.00
Stand. open hearth rails, mill	40.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	75.00 to 80.00
Spikes, railroad, Pittsburgh	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	4.90c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh	4.35
Barb wire, painted, Pittsburgh	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in. proof coil, Pitts. 8.00c
Sheet piling, base, Pittsburgh 4.00c to 5.00c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound.)

SHEET MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open hearth, Chic.	5.215c

TIN MILL, BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open hearth, Chic.	6.465c

BLUE ANNEALED

No. 10, open hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open hearth, Chic.	5.715c to 6.215c
No. 10, open hearth, Phila.	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pittsburgh $7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
⅛ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l. .30
Iron, 3½ to 4½ inches, c. l. 12½

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, New York	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pittsburgh, carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh.	4.65c
Boiler rivets, Pittsburgh.	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and 10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius.)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi-finished hexagon nuts ⅜ in. and larger	60–10–10 off
Cold pressed semi-finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products January 9, average for December 1917, average for October 1917, and average for January, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Jan. 9, 1918.	Average prices Dec., 1917.	Oct., 1917.	Jan., 1917.
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$37.25	$35.95
Basic pig iron, Pittsburgh.....	33.95	33.95	33.95	30.95
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	31.95
*No. 2 Foundry pig iron, Chic.	33.00	33.00	33.00	30.00
Lake Superior Charcoal, Chicago	37.50	37.50	48.50	33.75
Malleable, Chicago	33.50	33.50	33.35	30.00
**Southern, No. 2, Birmingham.	33.50	33.50	33.00	23.00
*Southern Ohio No. 2, Ironton.	33.00	33.00	33.00	30.00
Basic, eastern Pa.....	33.00	33.00	33.00	30.50
**No. 2X Virginia, furnace....	33.50	33.50	33.50	26.50
**No. 2X foundry, Philadelphia.	34.25	34.00	34.00	30.50
Ferro mang., delivered.....	250.00	247.50	302.00	175.00
Bessemer billets, Pittsburgh....	47.50	47.50	58.75	60.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	65.50	60.00
Open hearth sheet bars, Pitts..	51.00	51.00	65.50	60.00
Open hearth billets, Pittsburgh.	47.50	47.50	58.75	60.00
Steel bars, Pittsburgh.....	2.90	2.90	2.90	2.975
Steel bars, Chicago.....	2.90	2.90	2.90	3.19
Iron bars, Philadelphia.....	3.685	3.685	4.935	3.159
Iron bars, Cleveland.....	3.64	3.64	4.50	3.00
Iron bars, Chicago mill.....	3.50	3.50	4.50	3.00
Beams, Chicago	3.00	3.00	3.00	3.19
Beams, Pittsburgh	3.00	3.00	3.00	3.075
Beams, Philadelphia	3.185	3.185	3.185	3.509
Tank plates, Pittsburgh.....	3.25	3.25	3.25	3.575
Tank plates, Chicago.....	3.25	3.25	3.25	3.89
Tank plates, Philadelphia.....	3.435	3.435	3.435	4.909
Sheets, blk., No. 28, Pittsburgh	5.00	5.00	7.75	4.56
Sheets, blue anld., No. 10, Pitts.	4.25	4.25	7.875	4.125
Sheets, galv., No. 28, Pittsburgh	6.25	6.25	8.8125	6.56
Wire nails, Pittsburgh.....	3.50	3.50	3.875	3.00
Connellsville fur. coke.....	6.00	6.00	.....	7.25
Connellsville fdy. coke.....	7.00	7.00	.....	6.375
Heavy melting steel, Pittsburgh	30.00	30.00	31.50	23.25
Heavy melting steel, eastern Pa.	30.00	28.75	26.10	21.50
Heavy melting steel, Chicago...	30.00	28.50	27.00	20.25
No. 1 wrought, eastern Pa.....	35.00	35.00	40.80	26.50
No. 1 wrought, Chicago, net ton	31.00	31.50	31.90	23.75
Rerolling rails, Chicago.....	35.00	35.75	36.00	27.25
Car wheels, Chicago.....	29.00	29.50	25.90	19.75

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

(For Additional Prices See Page 188)

Furnace Crippling in Worst Stage

Shortage of Fuel Causes Great Number of Stacks to Bank and Immediate Improvement Not in Sight—Compulsory Revision of New Contracts to Fixed Prices at Delivery Checks Forward Selling

Pittsburgh, Jan. 8.—Perhaps the most serious shortage of fuel in the history of the industry is being experienced at present by blast furnace operators. As a result many furnaces are banked. There is no prospect of immediate improvement in the transportation situation and it is likely that the pig iron output for the current month will show a sharp decline. During the latter part of last week the Carnegie Steel Co. had 24 of its 59 furnaces inactive. Today it had 20 furnaces down, eight of them for relining and repairs and the others banked on account of a lack of coke. Some of them probably will be able to operate only temporarily because of the shortage of fuel. Operations of some independent interests reflect similar results. Difficulty is also being experienced by producers in making shipments on account of congestion and railroad embargoes, a great number of additional points being added to the list where freight cannot be shipped. Insistent demand has been made by some consumers for pig iron. There are practically no offerings. Furnaces are well committed for the first quarter and show a distinct disinclination to sell past that period, particularly because of irregular production and also on account of the uncertainty of prices after April 1. The tendency to cut off tonnages from consumers engaged in the manufacture of so-called nonessentials is growing and some pig iron makers have obligated themselves strictly to supply only those producing essential manufactures. One valley furnace interest has bought from another producer in the same district 5000 tons of bessemer iron at the regulation price of $36.30 and shipments are being made on this order. Some fair sized tonnages of resale bessemer and basic iron have been sold. Most of this was iron which was intended for export, deliveries of which had been held up. Small lots of foundry iron also have been sold for prompt delivery. A consumer in this district asked for 3000 tons of bessemer and 1000 tons of No. 2 foundry iron for second quarter.

New England at Standstill

Boston, Jan. 7.—Business in pig iron has been pretty much at a standstill since the beginning of the year. This is not because there has been no inquiry but because the iron is not available and the furnaces almost without exception are loathe to accept business until they know where they are at in the matter of supplies and also until they see the light with regard to contracts containing the government price clause. A contract subject to revision three months hence, as seen by local pig iron men, is a pretty one-sided proposition, for it merely amounts to a reservation for the user. As one man prominent in the trade says: "If I were a foundry owner, I should enter freely into contracts for iron with the contract containing the clause that I should not have to pay any more than what the government thinks is right." The obstacle to free contracting, however, is, the furnaces are sold up over the first half of this year and are not inclined to accept more business for the present, save in off iron. Some of this iron runs as low as 1.65 silicon, as high as 0.210 sulphur and some that could not be drilled. There is a fairly good movement of iron on contracts, with the

foundries rather anxious to get tonnage owed them. Shipments from most points have been a little better owing to an improvement in the car supply situation. In some sections, there is some anxiety to move iron on the high-priced contracts, but this is hardly common enough to occasion comment. New England foundries continue well off in the matter of coke supplies, but the steam coal situation is still badly strained in spite of efforts on the part of the fuel committee of the state. There are some foundries that must soon close down unless they get coal. Indeed, a few already have been forced to suspend.

Shipping Conditions Ascendent

Buffalo, Jan. 8.—The shipping situation rather than production is engaging the close attention of furnaces in this district at this time. From a commercial standpoint the negotiations throughout the week just closed were negligible, resulting in little more than some trading in off-grade iron on the part of one furnace. Another producer which has been having its troubles with the coke situation has retired from the market indefinitely. Shipments are so dilatory that the furnace will have to carry ahead much iron that was promised for delivery in the near future. Uncertainty as to the future has resulted in the interest deciding to refrain from quoting till it is in a position to guarantee deliveries. The shipping, serious enough, was rendered desperate with a New York Central embargo which became effective yesterday on all shipments to points east of Buffalo. This embargo hits many producers hard. Inquiry is good with producers being in a position to sell readily if they were able to ship. The inquiry is good for second and third quarter delivery, but at least one maker, approached for this delivery, declined to quote during the present unsettled condition of railroad affairs. The inquiry, Buffalo producers say, is unusual in that it is coming from all points. This indicates to furnace men the pressing need of most melters much of which they find impossible to secure within the boundaries of their own districts. Another heavy producer announces that it is sold up on practically all products for the year 1918. This is a producer which uses most of its pig iron in the manufacture of steel.

Selling is Checked

Chicago, Jan. 8.—Selling of pig iron in this market has come practically to a standstill, principally on account of the provision that deliveries after April 1 must be at whatever price the government has established for that period. Northern producers have been practically sold out for first half and all new business would be for last half or possibly second quarter. On this tonnage the provision for a revised price would apply. An important seller has not completed any contract since the announcement was made late in December and is holding up pending business until the form of the clause can be determined to fit conditions. Some southern sellers are said to be planning to add another clause reserving the right to cancel contracts if the announced maximum price should be below a profitable figure based on their costs. This adds to the uncertainty of the situation and increases the slowness of trading. A number of malleable users who neglected to buy when the market was active are now seeking tonnage, which is said to aggregate at least 20,000 tons at present. Some of these melters are in much need and are unable to obtain additional supply. Lake Superior charcoal producers have almost nothing to offer for first half delivery, but are willing to take further tonnage for second half under provision that the price shall be whatever the government has decided at the time of delivery. Consumers of this grade of iron are well covered until the middle of the year and are not now pressing for further contracts. Jackson county silveries now are being booked for last half delivery and bessemer ferrosilicon from 9 to 12 per cent is also available for last half. These contracts provide for a revision of price if a change is made from the present established level.

Try Out Last Half

Cincinnati, Jan. 7.—In the absence of iron to offer for prompt shipment sellers have tried out the last half market by offering some special grades that should be suitable for foundry uses. The effort to induce customers to book so far ahead has not been pressed and the tentative offers made for that delivery have not been met with any material response. Melters seem to think that no matter what price is named for shipment after March 31, there is no use to bind themselves with a contract that is subject to revision. They prefer to take chances on getting a supply of iron, as most of them can call on the government for assistance to fill contracts in hand. This condition is said to be general throughout the country, with most foundries depending on priority orders to get the iron due them. Although the furnaces are doing their utmost to rush iron to consumers transportation delays prove very vexing and in many cases are hard to overcome. The scarcity of basic iron is still a matter of serious comment. Although foundry iron is almost equally as hard to get, the foundry melters can use so many different mixtures that will absorb larger quantities of scrap that they are not as bad off as the steelmakers. Some Ohio silvery and bessemer ferrosilicon iron can be bought for last half shipment at the government's prices, subject to revision to conform to the schedule established after March 31.

New Demand Less Urgent

St. Louis, Jan. 7.—While still fairly keen, the demand for pig iron this week has been decidedly less urgent. Consumers with contracts are urging prompt and full deliveries, but less new business is being done than in several months. Consumption continues unchanged. One reason for the easing off in inquiries is the fact that producers who largely supply this point are sold up through the first half, and some have little to offer for third quarter. Reaffirmation of existing prices by the government has had the effect of holding down eagerness to purchase, users being satisfied no advantage can be gained by rushing into the market if no advance is likely. One of the East Side steel foundries was inquiring quietly for 3000 tons, and orders otherwise during the week aggregate something over 6000 tons of all grades. Virtually nothing was done in spot, sales being confined to a few scattering cars of off grades and a small tonnage of No. 2 southern released by a wiremaker. There has been less complaint on the score of railroad facilities by the local iron and steel trade. Contract material has been moving in quite promptly, and indications point to a still further improvement. Producers anticipate an output increase of from 5 to 20 per cent.

Basic Tonnage Allotted

Cleveland, Jan. 9.—An incentive to book for forward deliveries has been taken from pig iron sellers by the recent declaration of the President that contracts now made for delivery beyond March 31 must be subject to government price revisions. As a result, sales are few, although new inquiry is considerable and much tonnage recently put out still is pending. Producers have been studying the various angles produced by the new contract ruling. One of these refers

to the anticipation or deferment of shipments under contracts now being made. Accordingly, new clauses are being inserted in contracts covering this point. Large requirements for government work continue to come out. An order for 36,000 tons of basic covering shipment over a year in equal monthly installments beginning in March, for an Erie, Pa., consumer, has been distributed. This material is to cover navy castings. Lots of 1200 tons of foundry and 300 tons of high silicon malleable for government contracts at Bay City and Muskegon, Mich., also are out. War business in pig iron now is being distributed through the American Iron and Steel institute instead of directly by the steel director at Washington as in the past. A Canton steelmaker has been unable to satisfy a 20,000-ton basic requirement for second quarter.

East Stops Selling

Philadelphia, Jan. 7.—Business in pig iron has been brought to a standstill here as a result of the recent recommendation by the war industries board that all sales calling for delivery beyond April 1 be made subject to any change in the government price schedule at time of shipment. Owing to the fact that the furnaces in all cases are sold up to July 1, they are in no position, as a result of this recommendation, to make sales at definite figures, and since they consider any other method of doing business as undesirable, they are not booking anything. The exceptions to this rule are in a few trifling tonnages here and there which the furnaces manage to squeeze out for early shipment to regular customers. The only important sales of the week comprised tonnages on which negotiations practically had been completed by Dec. 31. These included some 8000 tons of high manganese basic for second half to a Trenton, N. J., melter, and 1400 tons of forward foundry for the Norfolk & Western railroad. Appreciating the uselessness of trying to buy under present circumstances, most consumers have left off inquiring. Copper-bearing low phosphorus iron is the only grade which now can be secured for nearby delivery. Among inquiries for this grade is one from a Pittsburgh steel foundry for 1000 tons for January and February. Eastern blast furnaces are running at a greatly reduced rate. Among furnaces which either are banked or which are greatly handicapped by the lack of coke are those of the E. & G. Brooke Co., the Alan Wood Iron & Steel Co., the Worth Bros. Co. plant of the Midvale Steel & Ordnance Co. and others.

Coke Crush Unparalleled

Traffic Congestion at Worst Stage in History and Government Hastens to Take Sweeping Action—May Pro-rate Shipments

Pittsburgh, Jan. 8.—Sweeping action is expected to be taken soon by the government to relieve the coke situation in the Connellsville region which is extremely serious. Operators and consumers say that the traffic congestion there at present is the worst in the history of the industry. It was estimated last Thursday there were 5000 loaded cars or more on the Monongahela railroad, the Monongahela division of the Pennsylvania railroad and the Pittsburgh & Lake Erie, some of which had been standing on the tracks between the ovens and the Brownsville connection for four or five days. Great quantities of coke have been drawn from the ovens and piled on the ground. The trouble has been due principally to the shortage of railroad crews and the reduced efficiency of motive power caused by the severe weather. While the car supply has been low, this is not an important element in the situation inasmuch as it has been impossible to move the great numbers of cars that have been loaded. The situation became so acute that Warren S. Blauvelt of the fuel administration has given the matter his personal attention. Mr. Blauvelt addressed a meeting of about 200 coke operators last Thursday night at Uniontown, and has also been in Pittsburgh and taken up with blast furnace interests discussion pertaining to a solution of the problem. Mr. Blauvelt in urging coke operators to produce as much coke as possible and to dispose of it at the government prices, said that everything possible would be taken to relieve the congestion. One plan being considered calls for the elimination so far as possible of cross hauls and another for the pooling of shipments where this is feasible. Consideration is also being given to a plan whereby blast furnace operators will ascertain the amount of coke required by each furnace to produce a ton of iron. It is then proposed that shipments of coke be prorated according to the fuel consumption of each furnace. A committee of seven coke operators to distribute tonnages was appointed at the Uniontown meeting. Modern furnaces it has been pointed out require from 1600 to 2100 pounds of coke to make a ton of iron, while some of the older stacks consume as high as 3000 pounds. While the movement of coke from the Connellsville region is severely restricted, some fair sized tonnages have been shipped, particularly to the east. By-product coke production also has been reduced at plants which have relied upon river transportation to obtain coal. Fuel Administrator Garfield has issued an order continuing the coke prices of Sept. 24 in effect until further order. Production in the Connellsville region for the year 1917 up to Dec. 29, totaled 17,848,341 tons, according to the *Connellsville Courier*, and for the week ending Dec. 29, totaled 251,398 tons as compared with 291,374 tons for the preceding week.

Chicago Storm Serious

Chicago, Jan. 8.—Heavy snow falling Jan. 6 blockaded railroads in the Chicago district to a degree that practically stopped all receipts of coal. The immediate effect of this was to limit production of byproduct coke and temporary banking of blast furnaces has been resorted to by steelmakers, thus greatly limiting the production of pig iron. Steel mills have been in the position for some time of having practically no reserve of coal and are dependent upon daily receipts for their coke-making material.

Can't Get Quotations

St. Louis, Jan. 5.—Extreme difficulty is being experienced in getting the eastern ovens to quote for any future delivery and getting anything for immediate shipment is entirely out of the question. The general demand continues as urgent as ever. Best posted members of the trade say the railroad situation has not improved, but on the contrary is worse right now than it has been, even during the recent extreme weather.

Shortage Grows in South

Birmingham, Ala., Jan. 8.—Coal and coke production in the southern district continues to grow, but the shortage is becoming more acute. Even in the city of Birmingham, within sight of coal mines, there is such a shortage of coal that retail dealers cannot serve customers, and the public schools and municipal utility plants are about to be shut down. Miners are being urged not only to work full time during the week days, but on Sundays and overtime.

Embargoes Stifle Scrap

Inability of Traders to Ship to Many Points Brings Market to Standstill—New Recommendations Questioned

FOR COMPLETE SCRAP PRICES SEE PAGE 188

Buffalo, Jan. 8.—With a good demand for all grades of scrap, Buffalo dealers find it practically impossible to make shipments. On account of the fact that nothing can be brought in, dealers' stocks are reduced, and because of the fact that nothing can be sent out, no shipments are being made. An embargo was placed on points east by the New York Central yesterday. That means that no scrap has left Buffalo since Monday noon for any point east of Buffalo except Rochester and a couple of other nearby points. All priority orders have gone by the board in a situation apparently caused by congestion of cars at places nearer tidewater. Notwithstanding the car shortage some shipments to points east were being made up till today when the big embargo went into effect. What appears to be the advance-guard of a blizzard hit Buffalo Monday and presents a gloomy prospect to shippers who were beginning to look for relief after the spell of very cold weather.

Weather Blocks Business

Boston, Jan. 7.—Business in old material can be considered good when full allowance is made for the severest wintry weather this section has had in years and the inadequacy of transportation facilities. Actually, the volume of business is light, for in addition to these obstacles, the supply of scrap is not large. Manufacturers not being able to secure new machinery to replace the old, are slow to dispose of the latter, even though practically worn out. New England foundries are so busy that the fear exists that later there may be a marked scarcity of cast scrap; demand for this class of stock in consequence is pretty sharp. The market is very firm. Wholesale dealers' paying prices per gross ton f.o.b. shipping points follow: Wrought No. 1 yard long, $29 to $30; horseshoes, $28 to $29; cotton ties, $20 to $21; No. 1 machinery, $33 to $33.50; No. 2 machinery, $28 to $29; stove plate, $19 to $20; car axles, iron or steel, $43 to $44; rerolling rails, $34 to $35; iron boiler plate, $34 to $35; bundled barrel hoops, $17.50 to $18; wrought iron pipe, new specifications, $24 to $25; steel rails, $25 to $26; No. 1 railroad steel, $25 to $25.50; heavy melting steel, $24 to $25; axle turnings, $18 to $19; machine shop turnings, $12.50 to $15; cast borings, $17 to $17.50; drop forge trimmings, $21 to $22; cast iron car wheels, mill price, $30 to $32.

New Recommendations Puzzle

Philadelphia, Jan. 7.—Considerable uncertainty prevails here as to just what was meant by the extension, Dec. 27, of the $30, delivered, maximum price on No. 1 heavy melting steel to "all grades of iron and steel scrap to be melted, which normally sold at or under the price of No. 1 heavy melting steel scrap, including malleable cast of all kinds and cast iron scrap of all kinds, including iron car wheels." While all these grades in the past have brought about the same price as No. 1 heavy melting steel when sold to steel plants, it has been customary to charge considerably more to foundries. Therefore the general interpretation of the ruling is that it does not cover cast iron scrap for use by foundries. During the past week, No. 1 heavy cast scrap sold here to foundries at $33.50, delivered eastern Pennsylvania, malleable cast scrap at $32 or higher, and for old car wheels $35 was bid. In view of the uncertainty, however, as to whether or not a maximum price of $30 applies to these grades even when for foundry use, the market is regarded as nominal. Dealers have had very little scrap to sell, due to the severe weather, and the attendant inability to move shipments. The latter condition has led to a scarcity at consuming plants and the latter are eager to pick up all lots offered. This is particularly true in heavy melting steel. This grade now is firm at $30, delivered. Fairly large sales of borings and turnings for blast furnace use were made during the week at $18.50, delivered. Wrought scrap is active, but scarce.

Movement is Limited

Pittsburgh, Jan. 8.—While the demand for old material exceeds the supply, tonnages moving are limited on account of the railroad situation. Dealers in this district are not showing much interest in the market, saying that they cannot find sufficient tonnages to take care of requirements and that it would be almost impossible to make shipments even though material could be obtained. They also apparently have shown only mild interest in the prices recommended by the American Iron and Steel institute committee on additional grades. Scrap dealers have been allowed a commission of 3½ per cent on sales and this is said to be having a tendency to make some consumers deal directly with sources of supply.

Complain Over Recommendations

Cleveland, Jan. 8.—Considerable complaint has been raised by some local dealers and consumers of scrap over the recommendation of the American Iron and Steel institute that maximum price of $35, delivered, be quoted on iron mill material which normally sold at or under the price of No. 1 railroad wrought. It is pointed out that this valuation of such grades as yard scrap, busheling, track scrap, etc., is entirely out of line with what these classes have commanded in the market in the past. None of these grades have been selling above the price of heavy melting steel, or $30, delivered, and some of them customarily have been below that level. Practically nothing is astir in the way of new trading in the local market, traffic conditions having effectually shut off business.

Digesting New Schedules

Cincinnati, Jan. 7.—Dealers have not yet fully digested the new government scrap schedule. Many of these changes will advance the prices on different grades of scrap, but these changes have not yet been definitely made due to the absence of transactions. The railroad situation is curtailing business to such an extent that scrap is moving very slowly to any outside point. Inbound shipments also are held up.

Chicago Market Quiet

Chicago, Jan. 8.—Comparatively little trading is being done in the Chicago market, buyers apparently preferring to take only such material as they need for immediate use and with supplies unusually scarce this situation is comfortable for dealers. Recent announcement of prices for first quarter carrying a provision for revision on second quarter delivery has caused many buyers to avoid accumulating scrap at present prices for fear of a reduction on their finished products delivered during second quarter. Usual sources of supply are not yielding as much material as usual, and some grades are in great scarcity, while there is no surplus of any kind of scrap. The Illinois Central offers 2220 tons, the Chicago &

Northwestern 2100 tons, the Santa Fe 2050 and the Wabash 1400 tons.

Trading at Stalemate

St. Louis, Jan. 5.—The market for iron and steel scrap is almost at a standstill. The demand is not active and neither buyers nor sellers are in the least confident of their position. Dealers say leading consumers will not buy, even at the government figures, and there is a disposition in all quarters to sit quiet and await developments. Important melters declare they are well covered by contracts and are getting ample material to carry on operations, despite railroad congestion. On the other hand, reserve stocks are low in many instances. Tonnage in transit continues to move very slowly. Railroad offerings this week have been larger than for some time, but a considerable portion is bound to be absorbed by the Pittsburgh district, so that relatively little will find its way here. The belief is expressed that by the end of this month things will loosen up and work back to normal. Offerings by the railroads before the market this week were: Pennsylvania Lines West, 2225 tons; Wabash, 1200 tons; Illinois Central, 800 tons; Boston & Maine, 700 tons, and Mobile & Ohio, 200 tons.

Southern Market More Active

Birmingham, Ala., Jan. 8.—The iron and steel scrap market in the south is a little more active and quotations are firmer. Dealers are apprehensive in taking on any large contracts. The car situation shows but little improvement. Heavy melting steel still is considerably under the government-fixed level so far as southern consumers are concerned, the highest price so far being $24, delivered. Old material dealers are anxious for a change in the quotations to an f.o.b. seller's yard basis. Supply is a little more plentiful, though there is yet much country scrap to be brought in. Inquiries are being received in the south from other sections, but delivery troubles are holding back possible business.

A bronze tablet, containing the names of the office men who have enlisted or have been drafted into military or naval service, has been decorated with an American flag and hung in the hall of the Trumbull Steel Co.'s office at Warren, O. The tablet is made so that the lower end can be extended by adding the names of the office employes who may be drafted in the future.

Sheet Mills Face Idleness

Embargoes on Shipments in All Directions May Force Shutdowns as Storage Space is Being Choked

Youngstown, O., Jan. 9.—A majority of the Mahoning valley mills got under way this week after a 10-day cessation over the holidays for repairs only to be served with embargoes which threaten the closing down of many of their number. In some cases incoming shipments of material are restricted while in all cases shipments of finished product have been discontinued until further notice. The Pittsburgh & Lake Erie railroad has embargoed all shipments of raw and finished material in and out of Youngstwn, the New York Central railroad all shipments of raw and finished material east of Buffalo, the Erie railroad all shipments of raw and finished material east of Port Jarvis, N. Y., and the Pennsylvania and Baltimore & Ohio railroads have embargoed from all points all outgoing shipments of finished material and all incoming shipments of raw material except coking coal and blast furnace stock, including ore, coke and limestone. The embargoes apply to government as well as domestic shipments. All the sheet mills are in operation at present, but if the embargoes are not lifted in three or four days, every mill in the valley will be suspended, the time depending upon the storage space available at the various plants. Inquiry for blue annealed has fallen off considerably since Jan. 1. However, black and galvanized grades are in great demand and several contracts have been closed for delivery late this quarter. In fact, few valley mills have any grades of sheets to offer for immediate delivery, their output for the first half of this quarter having been contracted for some time ago. As a rule salesmanagers are not booking further than two months ahead in view of serving government demands. One maker in the valley has turned down in the past week several demands for black and galvanized aggregating from 4500 to 5000 tons because the prospective buyer needed the material sooner than the mills could make delivery. Most large sheetmaker has just completed shipment of a large French tonnage of black and galvanized. Another maker has booked about 400 tons of black sheets for the Emergency Fleet corporation.

Mill Operations Low

Pittsburgh, Jan. 8.—Lack of steel has greatly curtailed operations of sheet mills in this district. One prominent maker is maintaining a schedule of about 50 per cent of capacity. The average operations will not exceed 60 per cent and may be below that figure. The difficulty goes back to the shortage of coke which has restricted the output of pig iron. Producers of sheets have committed themselves fully for the first half on blue annealed and black sheets and on galvanized sheets for the first quarter. Construction work of a commercial character being light, roofers and builders in general who have supplies of galvanized sheets in stock in some cases are trying to dispose of the material. It is not unlikely that considerable demand will be made soon for galvanized sheets by the navy department in connection with portable houses to be built at navy yards.

Chicago Demand Heavy

Chicago, Jan. 8.—Inquiry for steel sheets of all grades is heavy, all consumers apparently being in need of additional tonnage. Inquiry for export is especially strong, but most sheetmakers are unable to take on this business. The leading independent sheetmaker here is out of the market except for small tonnages of blue annealed for delivery during second quarter.

Tin Plate Stored

To Limit of Warehouse Facilities Because Shipment is Blocked

Pittsburgh, Jan. 8.—It will be difficult if not impossible for the mills to supply tin plate unless priority shipments are given that product. Mills rapidly are reaching the point where it will be necessary to shut down at least part of their capacity for lack of storage room. One maker has approximately 1,000,000 boxes ready for shipment but is utterly unable to move the consignment on account of the transportation situation. This has affected mills to such an extent that they have either entirely or almost exhausted their storage room. The seriousness of the situation is increased by reason of the fact that great quantities of tin plate are stored at plants along the rivers in this and nearby districts and in the event of floods it will have to be reworked.

More Trouble to Get Bars

Mills Lose Much Production as Result of Transportation Troubles—Expiring Contracts Extended

Pittsburgh, Jan. 8.—Consumers of iron and steel bars have been making unsuccessful efforts to obtain tonnages for prompt delivery. Some makers of iron bars are fairly well committed for the first quarter or four months, while certain producers of steel bars are obligated for the entire year. The implement trade also is showing more interest, and while it has not closed new contracts involving large tonnages for first half delivery, in this district, these buyers have sounded out the market. Some makers of steel bars have taken first quarter contracts fairly freely, particularly for bessemer steel. Mills have difficulty in making shipments to many points because of traffic conditions and priority regulations also bar some deliveries. In consequence they have been able to catch up more or less rapidly on their accumulating bar orders. In consequence consumers have been in a position to place contracts on other business for quick delivery, especially with independent mills. One large producer is understood not to be selling, but to have left itself in a position to accept any new business that it may care to take. In some quarters it is believed a seller's market in steel bars will develop soon.

Contracts are Extended

Cleveland, Jan. 9.—A policy of extending for at least 30 days unspecified tonnages of contracts expiring Jan. 1, is being followed by some large producers. This is especially of importance in bars where under the readjustment of production forced by war conditions various manufacturing users have been unable to employ their full tonnage. The automobile industry is a case in point. Bar deliveries, which have been easier of late, again are being set back by the loss of production due to shipping conditions. Some of the largest bar producers in the Pittsburgh district have lost heavily in output during the past week and many mills have been idle. Government work is furnishing some important tonnages. An order for 2400 tons of tire steel for artillery carriages was allotted to a Pittsburgh maker. Local rivet makers who are furnishing large lots for government ship construction, have placed some heavy orders, including one for 6000 tons. Some inquiries for vanadium steel for ordnance work are current. Some makers continue to offer first quarter contracts especially in bessemer steel.

Spot Buying in West

Chicago, Jan. 8.—General conditions in the market for hard and soft steel and iron bars tend to make it a spot proposition. The possibilities of new price being named for delivery after April 1 prevents buying far into the future, both consumers and makers preferring to wait the outcome rather than commit themselves on an uncertainty. The leading interest continues its policy of accepting small lots from regular customers for delivery at convenience, but the total tonnage involved in this business is not large. Its principal effect is to give a more comfortable feeling to the consumer. Hard steel bars are in light demand with implement manufacturers about the only present buyers. Nothing is being done by concrete builders and bed manufacturers are not now in the market. Bar iron is being sold in small tonnages for delivery during first quarter, but there is light inquiry and neither the buyer nor seller desires to contract for second quarter.

Shafting Market is Quiet

Pittsburgh, Jan. 8.—Makers of cold-rolled shafting report that new requirements involve relatively small tonnages. A considerable portion of the buying is for government needs. Some makers have taken first quarter business more or less freely, however. The automobile trade is expected to come into the market soon. Producers are having difficulty in making shipments owing to railroad embargoes.

Nut and Bolt Output Cut

Pittsburgh, Jan. 8.—Operations of nut, bolt and rivet plants in this district have been interfered with during the past week by the severe weather. Some producers were compelled to close down entirely for a day or more and others had to restrict operations in certain departments. Contracts and new business call for capacity operations and these are being maintained where weather conditions permit. Makers report that they are able to get adequate supplies of steel bars at 2.90c, Pittsburgh, for government requirements, but strictly at contract prices where they are to apply on domestic requirements. Producers have bid freely on an inquiry recently put out by the Jeffersonville arsenal, Jeffersonville, Ind., for 40,000,000 bolts. This order is expected to be placed this week among several makers. Domestic consumers are showing an increased interest in the market and there is some export demand for rivets.

Government Buys Hoops

Pittsburgh, Jan. 8.—Fair demand exists for hoop steel and the government recently took 400 tons for shipment to France, while another order involves 500 tons. Business was taken at the government price of 3.50c, Pittsburgh. Makers of both hoops and bands have been able to take good care of contracts and appear to be more interested in taking on new commitments and in consequence there seems to have developed a buyer's market in this line.

Cotton Ties Market Closed

Pittsburgh, Jan. 8.—The season for cotton ties has closed and will not be formally opened for several months. The government price on hoop steel being 3.50c, Pittsburgh, it is estimated that the cotton tie market for 1918 will open at approximately $1.75 per bundle, Pittsburgh, comparing with the price of $2.12, the opening price for 1917.

Government Buying

In Railroad Equipment Causes Speculation—More Car Inquiry

New York, Jan. 6.—Considerable speculation prevails in the eastern car market as to the immediate effect of government control on the buying of railroad equipment. One rumor is that the government, in an effort to clear up the present congestion and to facilitate shipments in the future, will place orders shortly for 100,000 cars. Well informed interests, however, believe that this report is premature. They state that in their opinion the first efforts of the government in straightening out the traffic tangle will be along lines of using present equipment to the best advantage, and to continue to do so until it is found inadequate. Much can be accomplished, it is thought, by the government plan to transfer rolling stock to roads where the traffic is not so heavy.

Included in the private business of the past few days are 200 hoppers which the Republic Iron & Steel Co. let to the Pressed Steel Car Co. Among current inquiries are 1000 coal

and 3000 flats for the Illinois Central which is the revival of an inquiry put out several weeks ago. The Atlantic Coast line is considering 1000 box cars. The Shippers Car line wants 50 tank cars.

Due to the impossibility of securing assurances as to deliveries, foreign demand has been of little consequence for several months. In view of this situation, an inquiry now is out from the Chilean State railways for 1000 cars of miscellaneous type is unusual.

Car builders recently have been under great disadvantage in quoting on new business, due to difficulty in getting steel. It has been impossible in some cases even to secure steel for cars for the government. One leading builder, who inquired for 30,000 tons of plates, largely for government work, failed to secure a reservation since the mills had all the tonnage they could turn out in ship plates for the Emergency Fleet corporation. Pending inquiries include 1000 tons of tie plates for the Pennsylvania and a slightly smaller tonnage for the Philadelphia & Reading.

In the absence of the government's fixed price on rails, numerous small lots of rails, ranging, in some cases, up to 500 tons each, continue to be sold at prices ranging from $75 to $85, f.o.b. mill.

Defers Rail Purchase

Cleveland, Jan. 9.—The Toledo Railway & Light Co., which recently inquired for 1000 tons of rails, has decided not to buy at this time.

New Car Inquiry Out

Chicago, Jan. 8.—Some additional activity is being manifested for freight equipment, although this is not extensive. The Atlantic Coast Line is inquiring for 1000 box cars and the Baltimore & Ohio railroad for 1000 each of hopper, gondolas and flat cars. This road is in the market for 30,000 wheels. It is stated that about 10,000 cars contracted for the Russian government and now being held up may be diverted to the Italian government by the makers to whom the Russian order was given. It is understood practically all the steel for these cars has been delivered and with changes to suit the Italian specifications these cars can be turned out promptly. The Illinois Central has not yet closed for 1000 gondolas, for which it inquired several weeks ago.

Several Norwegian munition factories have combined under the name Norsk Spraengstofindustri, with a capital stock of $3,216,000.

Steel Buyers Discouraged

Find Great Difficulty in Getting Semifinished Material and Cease to Inquire—Production Loss Complicates

Pittsburgh, Jan. 8.—Demand for billets and sheet bars has declined. This appears to be due to the fact that buyers have found it impossible to cover requirements and in consequence have withdrawn from the market. At the same time it is understood that some brokers have tonnages of billets and sheet bars in stock, but they are unable to make shipments on account of the railroads situation, or are not in a position to take tonnages at the government prices. There is considerable complaint that the government has not encouraged legitimate and important steel brokers by affording them commissions on sales. A number of mills are supplying bessemer steel on contracts for billets and sheet bars and use open-hearth material to meet government requirements. Production of billets and sheet bars is estimated at about 70 per cent of capacity in the Pittsburgh and Youngstown districts. Considerable inquiry is out for billets rolled from discard steel. One broker has asked for 2000 tons per month of 2½-inch billets rolled from discard steel for the entire year. Another middleman wants 4000 tons of 4-inch billets rolled from discard steel. While it is known there is a fair volume of this high carbon steel on the market many mills are remelting it to make up for the shortage of scrap. A Canadian interest is offering about 10,000 tons of 4 x 4-inch steel billets for immediate shipment. Billets of 4 inches and larger sell at $48.50, Pittsburgh, and 2½-inch billets for high carbon grades are quoted at $52 or $1 extra up to 0.60 or $2 extra for steel analyzing higher in carbon. Makers of wire rods are receiving inquiries for both domestic and foreign shipment. Canada, France and Italy are included in the demand from abroad. These tonnages are not large. Some mills are out of the market for both soft and high carbon grades and none appears to be actively seeking business.

Strip Demand Improves

Pittsburgh, Jan. 8.—Improvement is reflected in the demand for cold-rolled strip steel. The automobile industry is not buying as heavily as under normal conditions, but is expected to become a more important factor soon. Business placed directly and indirectly by the government represents a large portion of the demand. Operations are estimated at about 70 per cent. Railroad embargoes make it impossible to ship to numerous points.

Offerings are Few

Cleveland, Jan. 9.—Because of the loss of production due to traffic conditions, makers of billets and sheet bars are obliged to offer this material even more sparingly than in the past. Virtually no sales are being made. Local buyers of slabs report they have had little difficulty to obtain adequate supplies from their regular sources of late. A Canton buyer has inquired for 1000 tons of rerolling billets.

Wire Production

Severely Cut by Coal and Traffic Conditions—Consumers Affected

Cleveland, Jan. 8.—A severe loss of production is represented by the present curtailment of operations forced on the American Steel & Wire Co. in this district by coal shortage. Practically all the mills and blast furnaces are down and only two of the finishing plants have been operating. Consumers, however, are not pressing wiremakers for deliveries as the manufacturing trade is suffering from the traffic conditions equally with the mills and jobbing buyers are doing little. Specifications for bolt wire are heavy, due to the large orders being filled by these manufacturers to the Emergency Fleet corporation.

Receives Nail Order

New York, Jan. 7.—The Jones & Laughlin Steel Co. has been allotted an order by the government for 10 carloads of nails to be used in the construction of buildings at the government proving ground at Baltimore.

Output Greatly Curtailed

Pittsburgh, Jan. 8.—The output of wire mills in this district has been greatly curtailed on account of transportation difficulties, the lack of fuel and of steel. All of the mills of one prominent maker in this district were closed down throughout last week, and it is not likely that they will be able to resume during the current week. Some mills have had to draw on capacities outside of this territory to take care of immediate requirements.

Big Shape Tonnage Awaited

Government Ship Contracts Will Call for Further Large Lots of Fabricated Material—Crane Steel Closed

Philadelphia, Jan. 7.—Although no definite word has gone forth, it now is not expected that further contracts for fabricated ship steel will be placed by the American International Shipbuilding Corp. before March. At that time it is expected that some 96,000 net tons of steel will be placed for the construction of 35 troop ships, each 8000 tons deadweight capacity. So far this company has placed steel for 85 vessels for the government. Richardson & Burgess have been awarded the general contract for extensions to buildings Nos. 105 and 112 at the Washington navy yard. With this exception, the structural market is devoid of developments.

Await Government Tonnage

Pittsburgh, Jan. 8.—Fabricators in this district report that no sizable tonnages are being placed by the government, although it is understood that it is about to close for large requirements, some of them in connection with railroad building. The domestic market is extremely quiet. Mills are doing well in making deliveries considering the seriousness of the transportation situation. Makers of structural material are well filled for the first half.

Crane Steel Placed

Cleveland, Jan. 9.—An order for 2600 tons of structural material for a large hammer-head crane to be built by the McMyler Interstate Co. for the navy department, has been allotted to a Pittsburgh maker. Other structural business in this territory is flat.

Shops Don't Want to Buy

Chicago, Jan. 8.—Fabricating shops are not anxious to contract for more structural shapes than they already have on mill books. So little building is coming out that shops are almost bare of business except work for the Emergency Fleet corporation. For this work the government furnishes the material and relieves the fabricators of making contracts. During the past 10 days government awards have been unusually small, but fabricating shops are busy on business already placed. General structural work in the west is almost absent.

CONTRACTS PLACED

Buildings for West Virginia Pulp & Paper Co., 1200 tons to American Bridge Co.

Pier No. 15, Brooklyn, 500 tons, to L. F. Shoemaker & Co.

Boiler house for Potomac Electric Power Co., Washington, 400 tons, to L. F. Shoemaker & Co.

CONTRACTS PENDING

Grand central viaduct, New York City, 300 to 400 tons, bids being taken.

Boiler house at Washington, for Potomac Electric Power Co., 400 tons, bids being taken.

Bridge for Lehigh Valley Railroad, 500 tons, bids being taken.

Chronic hospital, Brooklyn, 250 tons, bids being taken.

Bank building at Titusville, Pa., 200 tons, bids being taken.

Bridges and track scales for Pennsylvania railroad, 700 tons, bids being taken.

Pier No. 6, State barge canal, 350 tons, bids being taken.

Light Buying

Prevailed in Iron and Steel Pipe—Southern Plants Light

Pittsburgh, Jan. 8.—The market for iron and steel pipe is firm at the prices established by the government but the demand is comparatively slow, due to seasonal dullness. Most producers are catching up on deliveries and in case of butt-weld iron pipe prompt shipment can be made by some mills. Makers of butt-weld steel pipe are somewhat slower in making deliveries and one leading manufacturer is from 15 to 18 weeks behind. Others are from two to three months behind. Deliveries of lap-weld iron pipe are deferred from one month to six weeks. One maker of lap-weld steel pipe is more than a year behind on shipments. The principal demand for lap-weld pipe comes from the oil country interests. Government requirements have been taken care of in good shape and present demands are not heavy. The Philadelphia Co. has not yet placed orders for 20,000 tons of lap-weld steel pipe and 9000 tons of iron pipe inquired for in December.

Western Buying Light

Chicago, Jan. 8.—Bids will be opened Jan. 18 at Ann Arbor, Mich., on 200 to 250 tons. Madison, Wis., has awarded 200 tons to the Central Foundry Co. for universal pipe. Buying is much below normal this winter, as usually by this time contracts have been placed by cities for considerable pipe for their extensions during the coming summer. Routine business, usually bringing in a fair tonnage, is also much below normal.

Southern Plants Need Orders

Birmingham, Ala., Jan. 8.—There is need for business at the plants of the cast iron pipe companies in the south. Government business, being received spasmodically, is not of an extensive nature. No encouragement is held out for an immediate improvement in the pipe trade, though intimation is given that in the early spring some municipal work may be forced to a head. Machine shops and foundries of the south are working on full time and in many instances overtime.

Ferro Contracts

For Last Half Being Made—Demand Generally is Small

New York, Jan. 8.—Business in the principal ferroalloys is exceedingly dull and buyers appear disposed to wait for developments before committing themselves any further ahead. Demand for ferromanganese consists of a few small tonnages which are wanted for prompt and nearby shipment. On ferromanganese the market continues firm at $250, delivered. Demand for spiegeleisen also is quiet and the market continues to be quoted at $60, furnace. On 50 per cent ferrosilicon there is a good demand for spot and nearby carloads. Scarcity of this metal is responsible for a continued strong tone in prices, 50 per cent ferrosilicon continues to be quoted at $175, delivered, for prompt shipment and at $160 to $170 for contract.

Chicago Ferro Steady

Chicago, Jan. 8.—Contracts are being made by the local stack producing ferromanganese for last half and to a less degree for second quarter. The quotation remains steady at $250, Chicago furnace, which has been in effect for some time. Demand is steady and the supply from this source is not large.

Pittsburgh Market is Quiet

Pittsburgh, Jan. 8.—The market for ferroalloys is quiet. Only limited inquiry is out for 80 per cent ferromanganese, although producers are understood to be in a position to ship fair-sized tonnages promptly at $250, delivered. Makers as a general thing are comfortably booked for the next three or six months. The demand for spiegeleisen which was fairly active recently, appears to have fallen off. This alloy is quoted at $61.50, furnace, for prompt delivery. Consumers of 50 per cent ferrosilicon are

fairly well covered, some of them for the entire year. This metal is quotable at $175, delivered, for prompt shipment. Small sales have been made at $185 to $207. Producers of the lower grades of bessemer ferrosilicon have committed themselves for the first quarter or the first half and are not making any offerings in the open market.

Reserve Ore

For 1918 Delivery But Few Contracts Are Being Signed

Cleveland, Jan. 9.—Some consumers of Lake Superior ore are making reservations with sellers, but practically no contracts are being signed.

The impression is generally held that little ore for 1918 delivery will be contracted for prior to April 1, when the government will again determine its program of prices. The ore prices which were reaffirmed on Jan. 1 are those which were obtained for 1917 ore.

Ore sellers have always made their sales for a 12-month period. For that reason the President's announcement that contracts should not be made to cover more than the 3-month period between Jan. 1 and March 31, unless subject to revision after that date, has confused the situation.

Some Relief

Now Coming to Coal and Coke Districts—Commandeer Supplies

Pittsburgh, Jan. 9. (by wire.)—Reports from the Connellsville region today are to the effect that the severe car congestion there is being relieved. On the Pittsburgh & Lake Erie railroad coke shipments have been moving rather freely and improvement is shown on the other lines serving the districts. Hope is expressed that the bettered conditions will soon result in good supplies of coke being furnished blast furnaces and allow many of those which are now idle to resume operating.

The coal car congestion in the Pittsburgh district has been almost cleared away for the first time in more than one year. Mines are said to be receiving 100 per cent of their empty car requirements. The mines, however, have not been loading cars as rapidly as was expected because of various holidays which have interfered with the work. Supplies have been commandeered to insure continued operations at plants engaged on war contracts.

Plate Output is Reduced

Inability of Plants to Get Coal and Metal Causes Idleness of Mills—Much Tonnage is Rejected

Philadelphia, Jan. 7.—Business in the plate market here during the past week included additional orders for several thousand tons of plates for shipbuilding, which were placed by the Emergency Fleet corporation, and some 2500 tons of 2 x 12-foot plates, for use in repairing cars, which were placed by the Pennsylvania railroad. Big inquiries continue to come out from all kinds of domestic consumers but the mills are forced to turn them away. At least 25,000 tons thus were refused during the week. Output greatly has been curtailed by the lack of fuel. Plate mills not only are suffering from lack of steam and gas coal for their own use, but from lack of coke at blast furnaces from which they obtain the pig iron for their open-hearth furnaces. At the Worth Bros. Co. plant of the Midvale Steel & Ordnance Co. at Coatesville, Pa., only one plate mill out of four is running and this is a small one. The plate mills of the Lukens Steel Co. at Coatesville are producing at only a fraction of their capacity. The government authorities have had the situation called to their attention repeatedly, but are unable to secure shipments of coal and coke in the necessary quantities.

Valley Mills Get Tonnage

Youngstown, O., Jan. 9.—It is estimated the government has placed orders for ship plates totaling between 30,000 and 35,000 tons among the valley mills during the past two months. Part of this tonnage was placed recently and will be used in the construction of submarines and the emergency merchant fleet. The plates for the emergency ships will be forwarded to one of the lake district where they will be fabricated into ships. At present, however, the plates are being stocked at the mills on account of the strict embargoes placed on all shipments of finished material out of this district. If the embargoes are not lifted or diversified soon, it is stated all mills in this territory will be completely paralyzed.

Government Taking Tonnages

Pittsburgh, Jan. 8.—Large plate tonnages are being taken by the government in connection with the shipbuilding program and it is believed that heavy requirements will be made soon for car and locomotive building now that the government has assumed control of the railroads of the country. The Russian debacle may result in many locomotives and cars building in America for that country being taken over for domestic use and it is reported part of this equipment may be exported to Italy. An interesting situation in the plate market is the offering by several mills of plates of certain sizes, not used by the government, at the regulation price of 3.25c, Pittsburgh. Some of the tonnages are understood to be bessemer steel. These offerings represent stocks which were accumulated when the high open market prices were prevailing. There is a dearth of car orders. Car makers report improvement in deliveries of plates, and appear to be receiving sufficient supplies to maintain operations as fully as labor conditions will permit.

Ship Steel Specified

Cleveland, Jan. 9.—The American Ship Building Co. has issued specifications to the different mills for a large tonnage covering its order for merchant ships recently taken. In excess of 10,000 tons was specified during the week. Most of this tonnage is for shipment within six months. Eastern plate mills have discontinued their offerings of either sheared or universals because of the lack of steel or because of government orders. It is reported that universal plates, however, can be had in other directions with less difficulty. Few variations from government prices now are noted. Local mills are quoting up to 4 cents from stock, but the tonnage is not important.

Manganese Ore Sales

New York, Jan. 8.—Prices on manganese ore recently have responded in marked fashion to the difficulties attendant upon secuirng vessels for bringing in the ore. Several sales of high grade foreign ore have been made at $1.30 per unit at tidewater and this figure now is the minimum. Sellers say that it would be easy to obtain even higher for immediate or fairly prompt delivery.

Operation of the Mexico, Santa Fe and Perry railway, an interurban electric road at Mexico, Mo., has been discontinued because of the fuel shortage. The road will be dismantled and all metal sold for scrap.

Recommend More Price Schedules

American Iron and Steel Institute General Steel Committee Announces Fixed Levels on Tool Steel and Iron Rolls—Further Differentials on Pig Iron Also Are Put Out for Adoption

ANOTHER group of price recommendations for iron and steel products under date of Jan. 7 has been announced by the committee on steel and steel products of the American Iron and Steel institute. The latest recommendations cover pig iron over 0.04 phosphorus and Virginia car wheel iron, iron rolls and tool steel. Chairman E. H. Gary's statement given in connection with the committee's announcement is as follows:

Referring to the statements of the chairman of the committee on steel and steel products of the American Iron and Steel institute dated Nov. 13, Nov. 20 and Dec. 22, 1917, recommending prices for certain steel products to be adopted as maximum prices, to take effect immediately, to apply to the requirements of the United States government, to the war requirements of the allies and for domestic consumption within the United States, the committee now makes similar recommendation to the iron and steel industry in respect of the prices and differentials below stated.

The recommendations so far made by the committee as to maximum prices, differentials, etc., cover the principal iron and steel products and the committee does not at present deem it necessary to make further specific recommendations.

In view of President Wilson's statement under date of Nov. 5, 1917, that the iron and steel manufacturers have agreed promptly to adjust the maximum prices of all iron and steel products other than those on which prices have been agreed upon, the committee now recommends to the iron and steel industry that the prices of all iron and steel products, maximum prices for which have not been agreed to with the war industries board or recommended by the committee, be promptly adjusted so as to be in line with the basis intermediate and finished products for which definite maximum prices have been established. The committee relies upon the patriotism and good faith of the iron and steel industry to accomplish this, and expressed the hope that all connected with the iron and steel industry will co-operate in the proper spirit to this end.

On Dec. 28, 1917, President Wilson authorized the following announcement:

"The President has approved the recommendation of the war industries board that the maximum prices heretofore fixed by the President upon the recommendation of the board upon ore, coke, pig iron, steel and steel products, subject to revision on Jan. 1, 1918, to be continued in effect until March 31, 1918. No new contracts calling for delivery of any of said commodities or articles on or after April 1, 1918, are to specify a price unless coupled with a clause making the price subject to revision by any authorized United States government agency, so that all deliveries after that date shall not exceed the maximum price then in force, although ordered or contracted for in the meantime. It is expected that all manufacturers and producers will observe the maximum prices now fixed."

The committee calls the especial attention of the industry to the above announcement, which applies to all prices, differentials and extras recommended by the committee.

Pig Iron Differentials

SPECIAL CAR WHEEL OR CYLINDER IRON

The price for Virginia or other special car wheel or cylinder irons containing over 1.00 per cent manganese may be made by adding to the base price per ton of $33, the following differentials for manganese:

Manganese	1.00	to 1.50	add	$0.50
Manganese	1.50	to 2.00	add	1.50
Manganese	2.00	to 2.50	add	2.50
Manganese	2.50	to 3.00	add	3.50
Manganese	3.00	to 3.50	add	4.50
Manganese	3.50	to 4.00	add	5.50
Manganese	4.00	to 4.50	add	6.50
Manganese	4.50	to 5.00	add	7.50
Manganese	5.00	to 5.50	add	8.50
Manganese	5.50	to 6.00	add	9.50

IRON WITH PHOSPHORUS OVER 0.04

Add to base price per ton.

Phosphorus	Copper-free	Copper-bearing
0.04 maximum	$20.00	$17.00
0.045 maximum	17.50	15.00
0.05 maximum	15.00	13.00
0.055 maximum	12.50	11.00
0.06 maximum	10.00	9.00
0.065 maximum	6.50	6.50
0.070 maximum	5.50	5.50
0.075 maximum	5.00	5.00
0.075-0.09 maximum	*	*

*Use bessemer price.

Iron Rolls

Prices are for condensed grain (sand) and chilled iron rolls.

The following prices are subject to the usual customs of the trade, as regards terms, guarantees, adjustments, replacements, etc. The delivery point is f. o. b. makers' works, but the prices include an allowance for actual freight, in accordance with published freight rates, to the freight station of purchaser, provided same does not exceed 20 cents per 100 pounds. All freight in excess of 20 cents per 100 pounds to be paid by purchaser. The freight allowance does not include any additional charges at destination (for switching service, spotting of cars, drayage, cartage, transfer, ferry car service) or any other expense over and above that covered by the published freight rate applying to the regular delivery station.

PLAIN CHILLED ROLLS

Price per pound

Under 8-inch diameter	10.00c
8-inch diameter and under 10 inches	8.75c
10-inch diameter and under 13 inches	7.95c
13-inch diameter and under 21 inches	7.15c
21-inch diameter and under 24 inches	6.15c
24-inch diameter and under 33 inches under 91 inches long	5.70c
24-inch diameter and under 33 inches, 91 inches long and over	6.15c
33-inch diameter and under 35 inches	6.15c
35-inch diameter and under 39 inches	7.20c
39-inch diameter and under 43 inches	8.30c
43-inch diameter and under 45 inches	10.25c
Rail rolls, 20-inch diameter and over, with open chilled finishing pass on one or both ends	7.15c
Rail rolls, under 20-inch diameter with open chilled pass on one or both ends	7.45c

Plain rolls, part chilled, same price as chilled rolls of like diameter.

Plain chilled rolls requiring over 1½-inch chill, ¼c additional, and at purchaser's risk of breakage, regardless of excessive depth of chill.

Sand rolls, with but one or two plain chilled passes, not less than plain chilled rolls of like diameter.

All other rolls having enclosed chilled passes or grooves, not less than 1.7c per pound higher than plain chilled rolls of same diameter; chills for making same to be charged for at not over 10 per cent above cost, and when paid for may be delivered to customers on demand.

Gap rolls for shovel mills, ½c per pound additional.

SAND ROLLS
Price Per Pound

Under 10-inch diameter	7.95c
10-inch diameter and under 13 inches	7.15c
13-inch diameter and under 21 inches	5.90c
21-inch diameter and under 34 inches	5.50c
34-inch diameter and over	5.90c

IRON PINIONS
Price Per Pound

Under 10-inch diameter	8.35c
10-inch diameter and under 13 inches	7.55c
13-inch diameter and under 21 inches	6.35c
21-inch diameter and over	5.90c

BOXING OR CRATING

Two per cent of face of bill additional.

The above prices for rolls are subject to a discount of ½c per pound where the purchaser sells and ships to the maker the broken and worn out scrap rolls and pinions produced in operation of its mills, not to exceed 70 per cent in weight of new rolls received, at not over $30 per ton of 2240 pounds in trade account, f. o. b seller's mill. Any excess freight over $2.50 per ton, necessary to transport such scrap rolls and pinions to works of maker to be paid by the seller of the scrap rolls and pinions.

Tool Steel

All prices f. o. b. point of shipment and net without discount.

HIGH SPEED STEEL
(Base Prices Per Pound)

	Mill shipments	Shipments from makers' warehouse stocks
High speed steel	$2.00	$2.01
Tungsten finishing steel	.65	.66

EXTRAS

All dimensions inclusive. Intermediate sizes take the next higher extra.

BASE SIZES

Round, square and octagon ⅛-inch to 2 inches inclusive.

Flat ⅛-inch to 2 inches thick by ⅛-inch to 2 inches wide.

EXTRA SIZES
(Extras in Cents Per Pound)

Round, Square and Octagon

Size, inches	
1/16 to ⅛	2.0
3/16 to ¼	3.5
5/16 to ⅜	6.0
⅜ to ½	8.5
2⅛ to 2½	2.0
2⅝ to 3	2.5
3⅛ to 3½	3.0
3⅝ to 4	3.5
4⅛ to 4½	4.0
4⅝ to 5	4.5
5⅛ to 5½	5.0
5⅝ to 6	5.5
6⅛ to 6½	6.0
6⅝ to 7	6.5

Flat

Size, inches	
⅛ x 1/16	40.0
⅛ x ¼	30.0
⅛ x 1/16	20.0
⅛ x ⅜ to 2	14.0
1/16 x ¼ to 3	14.0
¼ x 1/16 to ½	8.0
¼ x ⅝ to 1	5.0
¼ x 1⅛ to 4	3.0
⅜ x ⅜ to ⅝	5.0
⅜ x ¾ to 1	3.5
⅜ x 1⅛ to 4½	3.0
⅜ x 1/16 to ¾	3.0
⅜ x ⅞ to 1½	3.0
½ x 1⅝ to 5	2.5
½ x ½ to 1	3.0
½ x 1⅛ to 5½	2.5
½ x ⅝ to 1	2.5
½ x 1⅛ to 6	2.0
⅝ x ⅝ to 1	2.5
⅝ x 1⅛ to 6	2.0
⅝ to 2 x ⅝ to 2	0.0
⅝ to 2 x 2⅛ to 4	2.0
⅝ to 2 x 4⅛ to 7	4.0
2⅛ to 3 x 2⅛ to 4	2.0
2⅛ to 3 x 4⅛ to 7	4.0

Intermediate sizes take the next higher extra.

Annealing, 2c per pound extra.

Bevels, same classification as flats, plus 10c per pound for shape.

Cutting to Specified Single and Multiple Lengths
(Cents Per Pound)

24 inches and over	1.0
18 to 23⅞ inches	2.0
12 to 17⅞ inches	3.0
6 to 11⅞ inches	4.0

Less than six inches—special price.

Forged Discs
(Extras in Cents Per Pound)

Above 25 pounds	6
15 to 25 pounds	10
10 to 15 pounds	12
7½ to 10 pounds	14
5 to 7½ pounds	16
3 to 5 pounds	18
2 to 3 pounds	22
1 to 2 pounds	24
Annealing	2c per pound extra

Forged Die Blocks
(Extras in Cents Per Pound)

Above 25 pounds	4
15 to 25 pounds	6
10 to 15 pounds	10
7½ to 10 pounds	14
5 to 7½ pounds	16
3 to 5 pounds	18
2 to 3 pounds	22
1 to 2 pounds	24
Annealing	2c per pound extra

CARBON STEEL
Base price per pound

	Mill shipments	Shipments from makers' warehouse stocks
Non-shrinkable tool steel	$0.35	$0.36
Special tool steel	0.25	0.34
Extra tool steel	0.18	0.19
Regular tool steel	0.15	0.16

Prices are subject to established customs of trade, and to following extras:

All dimensions inclusive. Intermediate sizes take the next higher extra.

Unenumerated sizes at prices of the next larger on the list.

BASE SIZES
Extras in cents per pound

Round, Square and Octagon

5/16 to 2 inches	Base
2⅛ to 3	1.0
3⅛ to 4	1.5
4⅛ to 5	2.0
5⅛ to 6	2.5
6⅛ to 7	3.0
7⅛ to 8	3.5
⅛ to ½ inch	0.5
⅛ to 3/16	1.0
⅛ to ¼	2.0
⅛ to 5/16	3.0
⅛	5.0
⅛	10.0
⅛	18.0

EXTRAS
EXTRA SIZES
Extras in cents per pound

Flat

5/16 to 2 inches thick x ⅛ to 2 inches wide	Base
1/16 x ⅜	20.0
1/16 x ½	15.0
1/16 to ⅛	8.0
1/16 x 5/16	4.0
1/16 x ⅛ to ½	3.0
1/16 x ⅛ to 7	2.0
1/16 x 7⅛ to 8	3.0
⅛ x ¼	5.0
⅛ x ⅛	4.0
⅛ x 5/16	3.0
⅛ x ⅛ to ⅜	2.0
⅛ x ⅛ to 2	1.5
⅛ x 2⅛ to 7	1.0
⅛ x 7⅛ to 8	2.0
¼ x ⅛ to ⅜	2.0
¼ x ⅛ to ⅝	1.5
¼ x ⅛ to 2	1.5
¼ x 2⅛ to 7	1.0
¼ x 7⅛ to 8	2.0
⅜ x ⅜ to ⅝	1.5
⅜ x ⅛ to 8	1.0
⅜ x ⅛ to 8	1.0
⅜ x ½ to 8	1.0
½ x ⅜ to 8	1.0
⅛ x 2⅛ to 8	1.0
⅛ to 2 x ⅝ to 2	0.0
⅝ to 2 x 2⅛ to 7	1.0
⅝ to 1¾ x 7⅛ to 8	1.0
1⅛ to 2 x 7⅛ to 8	1.5
2⅛ to 3 x 2⅛ to 5	1.0
2⅛ to 3 x 5⅛ to 8	1.5
3⅛ to 4 x 3⅛ to 6	1.5
3⅛ to 4 x 6⅛ to 8	2.0
4⅛ to 5 x 4⅛ to 7	2.0
4⅛ to 5 x 7⅛ to 8	2.5
5⅛ to 6 x 5⅛ to 8	2.5
6⅛ to 7 x 6⅛ to 7	3.0
6⅛ to 8 x 7⅛ to 8	3.5

Intermediate sizes take the next higher extra.

Annealed steel, 1c per pound extra.

Cutting to Specified Single and Multiple Lengths
(Cents Per Pound)

24 inches or over	½
18 to 24 inches	1
12 to 18 inches	1½
6 to 12 inches	2

Less than 6 inches special price. Over 18 feet special price.

Carnegie Men Banquet

Judge James H. Reed officiated as toastmaster at the twenty-first annual dinner Jan. 5 at the William Penn hotel, of operating officials of the Carnegie Steel Co. The affair took on a distinctly war-time aspect, the menu, musical program and subjects discussed being arranged accordingly. In opening the speaking program, Judge Reed gave a toast to the success of the United States and its allies in the world war. He also discussed problems arising in the steel industry as the result of the war and the methods employed in overcoming them. President Homer D. Williams discussed steel and its place in the conflict, and Traffic Manager Louis C. Biehler delivered an address on transportation and its help in the struggle. The importance of man power and the large part the courageous soldiers are playing in the war, was emphasized by Charles C. Dinkey, who spoke on "Man—The Human Equation in the War". Colonel Henry P. Bope, vice president and general manager of sales, responded to the toast "Our Country", and his patriotic remarks were loudly applauded. Chairman Elbert H. Gary and President James A. Farrell were unable to be present.

Thirty-five hundred men will be employed by the Holt Caterpillar Tractor Co., Peoria, Ill., manufacturing farm tractors.

Steel Output Has Slumped

Traffic Congestion and Shortage of Supplies is Curtailing Production at Iron and Steel Plants

Production of iron and steel is being curtailed sharply, owing to traffic congestion. Blast furnaces are hampered by inability to secure raw materials, while steel plants are having difficulty in securing sufficient rolling stock to handle incoming and outgoing shipments.

The congestion has grown more acute. Last week at one blast furnace plant, 1400 loaded cars were held up. In the Connellsville district, 5000 cars of coke were stalled. The Carnegie Steel Co. had 24 of its 59 stacks idle during the previous week and 20 last week. Some of the largest barmakers have been forced to practically shut down. As an illustration, one independent producer in the Pittsburgh district had only five of its 17 mills running last week and two the preceding week.

At Buffalo some finished steel plants are partially shut down, owing to an accumulation of material without shipping facilities to carry it away.

Few mills in the Mahoning valley are operating over 75 per cent of capacity. The shortage of coal and coke and traffic congestion are largely responsible for the slump in production, although one plant is crippled considerably on account of the shortage of labor. Only 60 per cent of the coke ovens of the Republic Iron & Steel Co. are operating. In the Cleveland district, the American Steel & Wire Co. seems to be the worst sufferer, with three furnaces banked. Only its 35-inch blooming mill and open-hearth furnaces at the Newburg steel works are operating.

In New York, the scarcity of fuel due to freight congestion has been holding 150 ships in port. This, it is thought, may seriously threaten the supply of materials to the allies. At the six Atlantic ports—Boston, New York, Newport News, Norfolk, Baltimore and Philadelphia—40,000 carloads of export freight is on wheels, in warehouses or stocked. This expressed in tons would aggregate about 2,000,000 and would require 200 10,000-ton ships to carry it away. Half of the export freight at Atlantic ports is at New York. In addition there are about 13,000 carloads of domestic freight.

New England Hard Hit

New England industries, especially those in Massachusetts and Connecticut engaged on government contracts, are seriously effected by the car and fuel shortage, and already a number have been obliged to shut down temporarily. The locality hit the hardest is Bridgeport, Conn., where six plants closed early in the new year. Those were the American & British Mfg. Co., Locomobile Co. of America, Bryant Electric Co., Siemon Hard Rubber Co., Spring-Perch Co., and the H. O. Canfield Rubber Co. Deliveries of fuel oil also have been stopped in Bridgeport, except to the government. As a result of the plants closing approximately 14,000 men were idle. The state fuel administrator was empowered by the government Jan. 1 to commandeer coal for the munitions factories, and in consequence none of the big plants found it necessary to shut down.

Supreme Effort

Necessary to Win War, Says Gary—Should Import Labor

Concentration of every ounce of energy, as well as the appropriation of every dollar of wealth and the application of every atom of skill are, in the opinion of Judge E. H. Gary, chairman of the United States Steel Corp., necessary to win the war. In an address delivered before the Commercial Club of Chicago at a dinner in the Blackstone hotel recently, while not minimizing the might of the enemy, he predicted certain victory. He said in part.

After referring to some of the horrors of war, he continued: "This picture of war conditions is not pleasant to look upon, but it is not exaggerated, and it stares us in the face. We have been slow and stupid or at least indifferent. We have not realized and do not yet realize the full extent of the dangers which threaten us, and in this respect there is little difference between the citizens of the various parts of the United States.

"Our country, as a whole, including the several branches of the government, does not yet appear to appreciate that in order to win in this war, it is necessary to appropriate every ounce of energy, every dollar of wealth and every atom of skill within reach, to offer every sacrifice, even of personal opinion or pride or desire for the advancement of the interests of individuals or political parties."

He then treated of the scarcity of labor, and recommended that labor be imported from the islands of the sea and from the orient. He said: "It is manifest that in order to render the assistance that is asked of us, we must have more men. We cannot produce the quantities or amounts demanded unless the number of men is materially increased."

McKinney Steel Co.

Will Take Over and Operate Corrigan-McKinney Interests

Organization of the McKinney Steel Co., Cleveland, as a successor of the Quinnesec Iron Mining Co. and Corrigan, McKinney & Co., Cleveland, has been completed. By this plan of reorganization, the titles of Corrigan, McKinney & Co. and the Quinnesec Iron Mining Co., have been wiped out. The Quinnesec Iron Mining Co. has been the owner of all the properties and Corrigan, McKinney & Co. have been acting as its agent. In the future the steel works, blast furnaces and iron mines will be owned and operated under the name of the McKinney Steel Co. Incorporation of the McKinney Steel Co. under an Ohio charter has been made. No change in the present officers of Corrigan, McKinney & Co., or the Quinnesec Iron Mining Co., has been made. Price McKinney, who has been the dominating force in the Corrigan McKinney affairs for years, will continue as president, James W. Corrigan as vice president, and James E Ferris as secretary and treasurer.

Besides the extensive iron ore properties on the Superior ranges, the interests represented in the McKinney Steel Co. will be the River steel works, Cleveland; River blast furnaces, Cleveland; the Josephine blast furnaces, Josephine, Pa.; the Genesee blast furnaces, Charlotte, N. Y., and the Scottdale blast furnace, Scottdale, Pa.

Builder Buys Old Plant

Possession of the former plant of the Samuel C. Tatem Co., Cincinnati, has been acquired by the Oesterlein Machine Co., maker of milling machines and grinders, of that city. The transaction involves the transfer of a four-story, 60 x 266-foot building, a one-story, 103 x 300-foot structure and a power house. New equipment already has been purchased to supplement that of the newly acquired plant.

Causes of Blast-Furnace Breakouts

With Increasing Tonnage and Fast Driving, Breakouts Assume Serious Proportions, Sometimes Wrecking the Furnace, Occasionally Costing Lives, and Almost Always Causing Bad Messes, Delays and Inconvenience

BY F. H. WILLCOX

A BREAKOUT is the term employed to denote the conditions and results of the escape of gas and coke, or slag, or iron, from the bosh, tuyere breast, or hearth of a blast furnace. Breakouts may occur at any point below the fusion zone in the furnace, but the most frequent breakouts are of molten iron at a level below the surface of iron lying in the hearth, and are either through the hearth walls and jacket or into the hearth bottom and out under the hearth jacket.

If this runaway fluid iron comes in contact with water or wet material an explosion occurs which may wreck the furnace or cast-house equipment. Several furnaces have been put out of blast by such accidents, and in numerous instances men have been injured or killed by flames, flying metal, brickbats, and castings when these explosions take place. The hearth has received much attention, and heavier, stronger, and more expensive construction has been developed until the two types of hearth now standard rarely permit explosive breakouts.

Slag breakouts occur from the top of the hearth jacket and about the cinder notch up to the level of the tuyeres. They are seldom dangerous to life or limb, but may cause some damage to the brick lining and are a considerable nuisance and annoyance, because of the resulting delay for repairs and the time necessary to clean up the mess they cause.

The bosh of the blast furnace shown in Fig. 1 is an inverted truncated cone, so designed as to bring its top just below the zone of fusion, the limits of which depend on the grade of ore used and the temperature and volume of the blast; the bottom is arbitrarily fixed at 12 to 24 inches above the center line of the tuyeres.

The tuyere breast is comprised in that part of the hearth which extends from the bottom of the bosh to the top of the hearth jacket. The most energetic combustion of coke and the strongest inthrust of the blast are directly within this part of the furnace. The temperature at the nose of the tuyere may reach 3300 degrees Fahr., and may be as high for a considerable space adjacent, because the combustion of 750 pounds of coke cannot be instantaneous at the 12 or 16 small spaces in front of and above the tuyeres. As the nose of the tuyere is but 6 to 15 inches beyond the face of the brickwork the combustion temperature must reach nearly maximum intensity at the face of the brick. This temperature is sufficient to melt any but the best hearth brick and to soften the best brick so that it becomes plastic or will flow under compression.

To the effect of this high temperature must be added the effect of the blast. In an average furnace 40,000 cubic feet of air, expanded to 60,000 cubic feet at 1000 degrees Fahr., and at 15 pounds blast pressure is forced in each minute through twelve 7-inch tuyeres at a velocity of 310 feet per second. As the blast emerges from the nose of the tuyere with this high velocity it impinges on the mass of coke in the hearth. As this coke is held down by the weight of the furnace burden, the only way of escape open to the gaseous products of combustion is through the interstices between the pieces of coke. In spite of the great weight of the ore, limestone, and coke, the force of the blast makes the coke in front of the tuyeres and presumably that in the interior of the hearth above the tuyeres and along the walls dance briskly. On seeing this movement at the tuyeres one may imagine that the blast is thrusting the coke, which is still strong and harsh, against the hearth walls, and this is found to be the case on stopping the furnace. In some instances the hearth lining above, below and between the tuyeres has disappeared for a depth of 6 to 18 inches and may even be cut to so thin a shell that the furnace has to be blown out.

A few plants do not insert plates below the coolers, but bring the water-cooled hearth jacket up to the bottom of the cooler arch, thus relying on exterior cooling. Though the wall becomes much thinner before a cooling effect sufficient to arrest erosion is established, officials of these plants claim immunity from explosions of plates or breakouts at this point.

The objection to this construction is that the brickwork beneath the tuyere coolers becomes so thin that only an insecure foundation is left to support the coolers, and they may drop down or failure may develop beneath them. This is a valid objection, for the weakest place in a furnace equipped with cooling plates is immediately about the cinder-cooler opening, where at times the plates must be left out because of lack of room. Cinder breakouts occur at this point, between the top of the hearth jacket and cooler arches, not infrequently at some plants. There is, of course, the additional effect of increased erosion from the blast when the furnace is "blowing on the monkey" (flushing cinder when the blast blows through with the slag).

There is no adequate safeguard to prevent slag coming into the blowpipes which are made as heavy and with as thick walls as possible compatible with the necessity of taking them down and putting them up by hand almost daily. For this reason the pipe walls should not be thicker than 7/8 inch, which is sufficient to

Bosh Breakouts Seldom Occur

BLAST, gas and coke breakouts, usually known as bosh breakouts, are almost a thing of the past. Their elimination may be attributed as much to improvements in practice, smoother work on increasingly inferior ores, and less violent slips, as to strengthening of boshes. Although improvement in boshes is generally keeping pace with other furnace construction in increasing security, nevertheless, at many plants the bosh is not as strong, proportionately, as other parts of the furnace. With the present control over furnace operation, the bosh fails only at infrequent intervals. However, if plants with somewhat weak boshes should be subjected to periods of heavy driving for large production, with consequent severe slips, it may be that some boshes, although adequate for normal pressures and slips, would give away.

This article is an extract from a bulletin entitled "Blast-Furnace Breakouts, Explosions and Slips" by F. H. Willcox, bureau of mines, Washington, D. C.

withstand a severe attack, and are usually ½ inch thick. They are usually made of the best grade of bessemer iron, as a poor grade will bend and cut more easily. A few plants use blowpipes made of lapwelded steel pipes. Such pipes may be cheaper under local conditions, but are not as resistant to attack by slag and iron.

Thinning of Hearth Walls

One point should be kept in mind in regard to hearth breakouts, and that is—regardless of the thickness of hearth walls or the cooling intensity on the exterior, all furnaces become worn away on the inside in much the manner shown in Fig. 2, so that the wall becomes relatively thin and retains its form only by virtue of the cooling reinforcement of a metal jacket. This condition is found in furnaces blown out even after a short run.

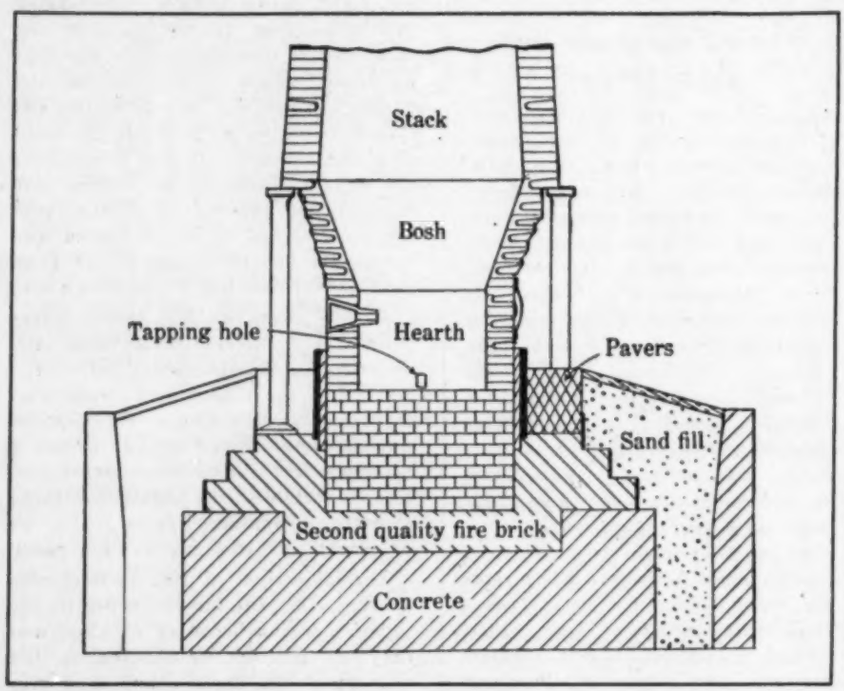


FIG. 1—SECTION OF HEARTH, BOSH AND FOUNDATION OF MODERN BLAST FURNACE

Added to this erosion is the attack of slag. While the composition of blast-furnace slag is frequently acid, that is, rich in silica and alumina, nevertheless, even when viscous with silica, it will combine with avidity with more silica. This is because slags of even pronounced acidity, as regards furnace requirements, are basic from a mineralogist's standpoint. Of greater significance, however, is the physical state of the slag and its effect on the facility with which the slag will attack brickwork. A thinly liquid slag will penetrate the interstices and joints of the brickwork more easily than will viscous aluminous or mucilaginous limy slags. Such slags tend to adhere to the walls and to freeze in cavities, whereas a fluid slag is more likely to drain from the walls at each cast and flush, and on rising it again attacks the exposed surface of the constantly enlarging cavities in the brickwork. All refractory materials tried are destroyed by the physical-chemical activities of heat, erosion and slag, and with a sharp slag and highly heated furnace, corrosion will bring about an unperceived destruction of hearth walls in a short run, the hearth walls sometimes losing 3 feet of thickness.

This action continues to the point where the chilling effect of the water-cooled hearth jacket is sufficient to prevent softening or slagging of the brick. After the destruction of the hearth wall has been arrested by the cooling jacket, the graphitic coating deposited over the brickwork aids greatly in preserving the remaining ring of brickwork, as the graphite is not affected by nonferruginous slag.

The Graphite Coating

The graphite coating is rarely homogeneous. On examination it is found to be composed of flakes, layers and stratifications, between which are veins of slag and iron. These layers are evidently built up as the furnace alternately scours and incrusts the wall with varying conditions of graphitic or white iron, limy or raw cinder, hot or cold working. Various analyses have been made of this material; three typical analyses are as follows:

Constituent	Per cent	Per cent	Per cent
Graphite	25.3	48.4	70.0
Iron	70.0	18.3	12.0
Silicon	1.9	0.1	3.0
Titanium	1.9	0.1	....
Slag	....	27.1	....

It is considered that loosely held brickwork, because of the possibility of cracks developing in it, gives the greatest danger of breakouts. When such a crack forms, the molten iron penetrates it instantly, and if not checked by the hearth jacket may come through. There may be 6 feet of fluid iron above the tapping hole and 2 feet of slag above the iron. The pressure per square inch of 1 foot of iron is 3 pounds, and 1 foot of slag, 1 pound, so that in this case the pressure is 20 pounds. If to this a blast pressure of 25 pounds be added, a total pressure of 45 pounds per square inch is exerted on the molten iron at the bottom of the hearth.

Sudden Breakouts

As a rule, breakouts through the hearth jacket occur suddenly. If cleavage cracks form slowly with the iron following them, the water on the hearth jacket or in the circulating coils becomes steamy several hours before the crack reaches the jacket, and, by cooling the jacket vigorously with a large volume of circulating water, the fluid iron may be chilled and the crack stopped. Undue thinning of the walls is similarly shown up and combated. However, if the crack opens suddenly, as is frequently the case, a jet of fluid iron is forced through the joint and penetrates without warning to the hearth jacket. Unless this invading molten mass is instantly solidified by the cooling effect of the hearth jacket it melts a hole in the jacket and the entire fluid contents of the hearth above this point are ejected with considerable velocity. The opening enlarges sometimes until it is large enough to put a barrel through.

Explosions of molten iron are due to the sudden and confined generation of steam when the molten iron comes in contact with moisture. A secondary cause may be the formation of hydrogen by the action of incandescent iron upon water, the hydrogen in turn exploding in contact with air. There are some peculiar features about the action of water on molten metal. For instance, molten iron may be run into water and be granulated or made into shot without any explosion, provided the water is deep and in large quantity. However, a blue hydrogen flame always appears upon the surface of the water. If iron in great excess

enters water, however, a violent explosion takes place.

Upon blowing a furnce out, the brickwork of the hearth bottom is seen to be replaced by a mass of pig iron, or a mixture of pig iron, slag and graphite, varying in depth from 4 feet to, in one instance, 26 feet below the tapping hole. Comparatively shallow depths are usually liquid, while deep pockets are usually solid or, unless drained, solidify after the furnace is blown out. These masses of material have long been known as "salamanders".

Action Beneath Tapping Hole

The penetration of this fluid mass into the foundations of the furnace gives rise to breakouts beneath the tapping hole. The cause is due to a variety of conditions. The erosive action of the blast may be eliminated, and also corrosion by slag, for except prior to the first cast and at infrequent intervals during the first part of the run, the hearth bottom is covered with liquid pig iron, which would prevent any slag coming in contact with the brickwork or gas circulating adjacent to it, except for brief periods immediately after casting. As the depth becomes greater, even this occasional contact is eliminated.

The other and most accepted explanation of the formation of salamanders is that the individual shapes comprising the hearth bottom are buoyed up by the weight of the supernatant iron, and being insecurely bound in, float up and dissolve in the slag. A cubic foot of brickwork weighs approximately 150 pounds, as compared with a corresponding weight of 450 pounds per cubic foot of pig iron. It is to be noted that it is not at all unusual for a furnace with a 16-foot hearth to make six casts per day of 100 tons each, and this presupposes a height of molten metal in the hearth of 2 to 4 feet, according to the extent of erosion and widening of hearth walls. With 2 feet of slag on top of the iron and 15 pounds blast pressure in the interior of the furnace the force exerted over the surface of an area 12 inches square would be equivalent to a hydrostatic pressure of 2800 foot-pounds. Unless every joint between the shapes making up the hearth bottom is absolutely flush and tight along all vertical and horizontal faces, the fluid iron under such high pressure will penetrate the joints.

When one or a group of these shapes has been isolated from the adjacent brick by a skin of fluid iron, the mass must, by reason of its lighter density, float up in the overlying molten iron.

The eating away of the hearth bottom is usually slow. In many cases furnace men report that after the furnace bottom has reached a depth of 4 to 6 feet below the tap hole, little further burrowing of the iron takes place, but that the furnace bottom works up and down, varying with the working of the furnace. When a furnace is working hot in the bottom and fast, the hearth deepens, and when it is working cold or slow, the hearth builds up. The latter condition should, in fact, promote building up, because the equilibrium between the heat supplied to the furnace bottom and the amount given off to the surroundings is changed in favor of the latter. If the hearth bottom is laid snugly and on heating up expands slightly so that it is tied in, this same heat equilibrium should arrest the downward growth of the salamander, both by retarding any slagging action and also by the decreased fluidity due to chilling of the iron at depth.

The cooling effect of the jacket extends only slightly into the brick on account of the low heat conductivity of the brickwork and does not hinder the molten iron from working back to where the cooling is effected. From this point a sudden crack or erosion of the wall will admit the iron to the jacket. This has happened so frequently that repeated experience has demonstrated that a simple rolled-steel jacket does not suffice to hold the iron in. A ½-inch jacket is often useless in this emergency, and a 1-inch jacket occasionally so. Although the jacket is covered with a film of water that cools it sufficiently under normal conditions, the mass of cold metal is not sufficient to freeze the fluid iron by dispersing its heat, and thus the advantage of the cooling water is not utilized. Practice shows that breakouts with this type of jacket are frequent. The breakout assumes more serious consequence because the jacket is surrounded by a ditch which contains a few inches to 2 or 3 feet of water. If only a small amount of this iron comes in contact with a large volume of water there is no explosion, but when the iron continues to escape in increasing quantities explosions usually occur. This danger has been so repeatedly demonstrated that most plants have eliminated the ditch and abandoned the idea of surface cooling.

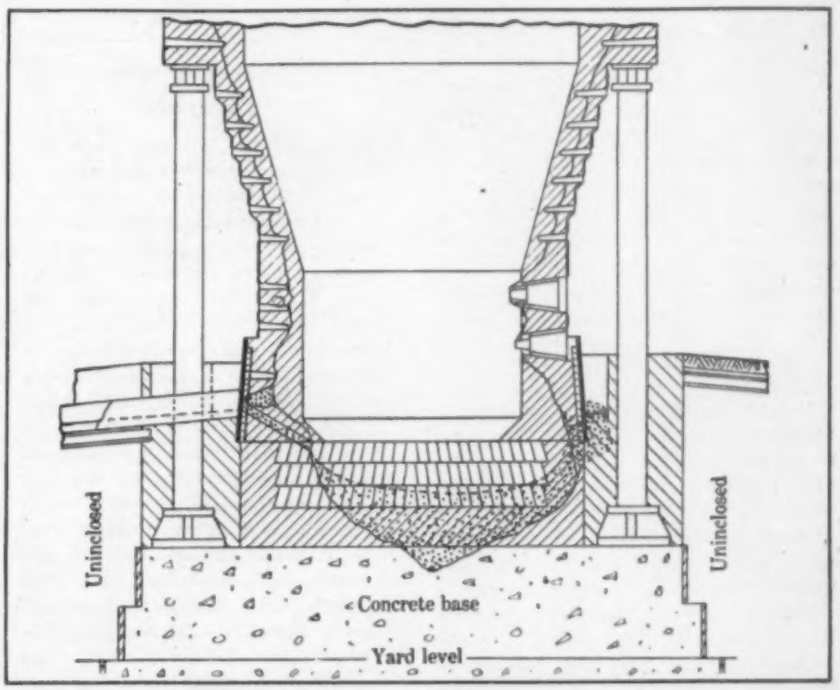


FIG. 2—DIAGRAM SHOWING HOW HEARTH WALLS ARE ATTACKED AND IRON REACHES THE FOUNDATIONS

Conductivity of Fire Brick

Fire brick of hearth and bosh quality has a heat conductivity of 1.32 (kilogram-calories per square meter per hour). The requirement is better met by a material having a high heat conductivity, and this demand is satisfied by iron or steel with a heat conductivity of 300. Also the plate must be thick enough so that in addition to its high heat conductivity and the quick dissipation of heat to cooling water it offers a large mass of cold material to absorb the heat and chill the fluid iron. This is the case with a 6-inch cast-iron jacket,

cooled by water circulating in pipes, or by a 4-inch cast-steel jacket with spray cooling. The cast-iron jacket with pipe cast in is sometimes designed with a corrugated surface and is cooled with a spray in addition to the circulating water in the pipes. This is probably the most intensive cooling possible.

To eliminate the danger of iron coming through the joints between water-cooled castings, one firm uses two rows behind a rolled-steel jacket, the joints being lapped. In order to eliminate the danger of losing the cooling effect of an entire section by intrusion of iron, the pipes may be bent and cast-in in U-shape, the feeds and discharges of several being connected in series so that if one is lost the others in the casting may still be kept in commission. To take care of water from temporary discharges of tuyeres, plates, and other cooling parts, there is left a shallow ditch 6 inches deep by 12 inches wide, but even this is sometimes eliminated. In some plants a circle of 6-inch pipe is laid about the hearth with funnels at each column, or there may be a circle drain pipe with funnels at columns laid in the brickwork about the jacket.

Attention to Water Supply

Several precautions and emergency measures may be taken to minimize the danger incident to breakouts. The bosh-cooling plates and also the plates about the tuyere breast should be flushed out regularly once a week with water under high pressure to prevent excessive accumulation of sediment. If this precaution is neglected failure of the plates is much more likely. In the lower part of the furnace, where the plates may come in contact with molten iron in the hearth, an explosion may result if the iron touches a plate insufficiently cooled because of water circulation being hindered by deposited mud.

The feed water for the cooling equipment should go through a double basket strainer with holes not larger than ¼ inch. These baskets should be changed and cleaned at the beginning of each shift, and in times of flood water when leaves, chips, and other debris may be drawn in at the pumps, the strainer should be inspected more frequently. In addition to provision for high-pressure water, there should be a steam line into the cast house to blow obstructions out of cooling pipes cast into the hearth-jacket segments or plates. Steam at 130 to 150 pounds pressure will frequently open a plugged or slowly dribbling pipe that does not respond to high-water pressure.

In the event of an obstinate hole or breakdown at the mixer or pig machine, delay in emptying the beds, or delay in spotting the ladles, care must be taken that the iron does not rise too high in the hearth. At some plants where the hearth walls are known to be weak, or the hearth bottom low, the blast is taken off just as soon as any delay develops without promise of immediate correction. Other plants keep on full wind for not more than 40 minutes after the regular casting time. If the delay still persists the blast is reduced from a pressure of 15 to 9 pounds and then to a pressure of 4 to 5 pounds. This low pressure is kept on not more than 20 to 30 minutes, as it may make the furnace stick; then the blast is taken off altogether and the furnace drafted back.

Hot Spots—A Source of Trouble

BUCKLING introduces an important operating difficulty because if the surface of the jacket is not perfectly smooth, the film of water essential for cooling and preserving of the brickwork will not cling to it. In a short time the small space not water-cooled becomes hot and then white-hot as the brick work or the conglomerate on the inside melts off. The jacket is quickly exposed to the attack of iron and slag which may melt an opening through it. This lets out a jet of incandescent coke, gas, slag, and iron globules which rapidly enlarges the opening and may result in a serious breakout. The formation of surface inequalities during operation is discouraging, for they make useless the care and money spent during construction to insure a perfectly smooth surface.

The furnace should be flushed more or less continually during such delays to keep the cinder away from the tuyeres. Care should be taken not to let the iron come over the cinder notch, as it may cause an explosion, and especially not to keep the wind on until the iron is above the cinder notch and cinder at the tuyeres, when the cinder cannot be flushed without danger of cutting the "monkey" and cinder coolers nor the wind be taken off without the blowpipes filling.

Stopping the hole at such times is difficult. Cinder is nearly always lying in the hole and the nose of the gun does not fill the hole, and instead of the clay being forced into and beyond the interior face of the wall and packing against the face it sometimes escapes back about the nose, extends only partly into the hole, and fails to fill it completely; cinder or molten iron may escape and come back in the gun as the plunger is drawn back, necessitating a delay, the hole chills up, and no more clay can be forced in. These results may occur even with holes of normal size if the gun is not placed squarely in the hole, is not properly loaded, or if the operator is unskilled or unfamiliar with the method of operating the throttle lever. If a hole is short or hard, care must be used in drilling into it on the next cast to avoid a breakout if the drill goes through the skull unexpectedly.

Care of Tapping Hole

With increasing production the bottom of the hole is made deeper and deeper as the hole is drilled, the angle of slope being increased until the desired capacity is reached. With higher blast and production the cutting effect is increased, until eventually as much as three handbarrow loads of clay are used to stop the hole. One barrowful, with the clay in the barrel of the gun, is more than enough to fill the hole, the two extra barrowfuls being used to insure that the walls and a substantial roof are built up. At this stage such excess clay, besides replacing the walls, tends to flatten out on the inside of the hearth wall and to thus form a key which locks the stopping clay in place within the hole and prevents it from being blown out by the internal pressure. The hole in a 36-inch hearth wall is frequently 5 feet long, but because of its slope does not project in as far as the length might indicate. It is desirable to keep the inner end of the hole away from the face of the hearth wall so as to protect the brickwork from the effects of the current of gas blowing down from the tuyeres and out the hole. This may be overdone, however, and the hole have so long a roof built up that there will be danger of the roof breaking through while the men are at the drill.

When the furnace is blown in the iron notch is rammed full of clay mixed with up to 33 per cent of coal or coke dust, the men working from the inside and outside of the furnace. The notch is sometimes left closed, but usually a 4-inch pipe is inserted in it when it is being clayed up. The pipe should project at least 6 inches inside of the brick lining, and clay be well packed about that part, so that the end will be well inside of any skull that chills on the walls. Holes are drilled in the outer end of the pipe, so that it may readily be withdrawn. Sometimes no pipe is put in, but the clay is packed about a tapered form 4 inches in diameter at one end.

6 inches at the other, and 6 feet long, which is withdrawn after the furnace is filled and ready to light. This is done to insure the hearth bottom being heated by the gas sweeping down through and out of the tapping hole, and also because on blowing in great difficulty is usually experienced in opening the tapping hole, if it is closed from the start, on account of the iron chilling against the cold walls, as frequently the first iron coming in contact with the hole seems to be cold and insufficiently carburized, so that it is tough.

A hole taking clay poorly, working short, or working high up, indicates the necessity of a very deep stopping, extreme caution in drilling, and, if the trouble persists, inserting over the tapping hole a longer tuyere or one with a smaller nose. At times building up about the inside face is aided by temporarily plugging the tuyere for 24 hours. The opening of the tuyere will be easier if a bar hole is pierced through the clay to prevent it from ironing over. If the hole is very short or the wall over the hole is thin, a cold blast on the face of the clay helps to hold it between casts.

The gun should be left in the hole with the steam on for several minutes after the blast is fully on and the hole stopped, in order that the plunger shall hold the clay in the barrel firmly against the plug of clay in the hole and prevent it from blowing out. The gun should not be removed from the hole until the clay has set solid on the inside, which may require 10 or more minutes; 20 minutes allows a minimum factor of safety, and many plants require 30 to 40 minutes.

Pickling With Nitre Cake

Scale Removed from Castings by Pickling in a Solution of Nitre Cake—A New Use for Waste Product

NITRE cake is a product in the manufacture of both nitric and sulphuric acids. Up to the year 1907 it was not considered as a by-product, but as a true waste product, and the chief problem in connection with it was the method of disposal. Most acid plants are located adjacent to streams, and the nitre cake was run into them. Even as late as 1912 some writers refer to it as a true waste product, and it has been an up-hill battle successfully to educate manufacturers both as to its merits and its uses.

Source of Nitre Cake

Nitre cake, such as the E. I. du Pont de Nemours Co., of Wilmington, Del., produces, is a fused salt containing approximately 78 per cent sodium bisulphate, 20 per cent normal sodium sulphate, a trace of ferrous sulphate, some silicious matter insoluble in water, and a small amount of moisture. Its acidity is equivalent to 32 per cent sulphuric acid, and in all its reactions it may be looked upon as containing this amount of available acid. The specific gravity of nitre cake is about two, varying wth the acid content, but in engineering practice we reckon the solid cake as weighing 126 pounds per cubic foot and piled in slabs 100 pounds per cubic foot. Nitre cake is readily soluble in warm or in hot water. The following amounts of nitre cake will dissolve in 100 parts of water at the temperature stated and achieve a saturated soluton in the time stated:

104	parts at	30° C.	in	105 minutes.
124	parts at	60° C.	in	45 minutes.
130	parts at	80° C	in	30 minutes.
160	parts at	100° C.	in	30 minutes.

At very low temperatures the acid sodium sulphate is broken up and the solution behaves like normal sodium sulphate dissolved in sulphuric acid. Attempts have been made to separate the normal sodium sulphate from sulphuric acid by this means, and temperatures as low as—23 degrees Cent. have been tried. However, it was found that the sulphuric acid would contain about 10 per cent sodium sulphate and the sodium sulphate about 9 per cent acid, and that the highest acidity obtainable is 29 per cent.

The chief industrial use of nitre cake at the present time is in the pickling of iron, steel, copper and brass. Pickling refers to the process of removing the oxide scale from the surface of metals, the scale having been formed during some heat-treating or rolling process. For pickling purposes, wooden tubs are used, in which the metal is immersed in solution. Pickling is accomplished in either agitated or quiescent solutions.

In the use of nitre cake for pickling, it is customary to make up in the tubs a solution containing ¾ to 1½ pounds of nitre cake to the gallon of water, which is equivalent to a 2 to 5-degree B. acid solution. Certain grades of steel, notably high-speed steels, require only ¾ to 1 pound of nitre cake per gallon, while others require more, in some cases exceeding the maximum mentioned. The solution is kept hot by means of steam coils, and if the solution is to be agitated, cleats are nailed to the bottom to prevent the detached scale from rising and fouling the pickling liquor.

Speed is essential in pickling(and the metal is taken from the tank as soon as the scale is removed. It is then washed in water and in a lime bath (the latter to neutralize the remaining traces of acid) and finally in water again. When the acid content of the pickling solution begins to weaken, the action in removing the scale is not so rapid. Additional nitre cake is then introduced until the bath becomes high in sodium sulphate and further additions of nitre cake fail to maintain the speed of the solution. At this point, part of the bath is siphoned off and a fresh solution of water and nitre cake is introduced. At the end of each run an entirely fresh bath is made.

In some foundries the castings come from the molds with particles of sand and scale firmly adhering to them. Neither sulphuric acid nor nitre cake will remove this sand entirely, and so sand blastng has to be resorted to. To sand-blast a casting requires a considerable length of time, say 20 to 30 minutes for each casting. If, however, the castings are pickled for from one to three minutes in a solution of nitre cake and then sand-blasted, the time required is less than half of that required for the sand-blasting process without preliminary pickling.

Advantages of Nitre Cake

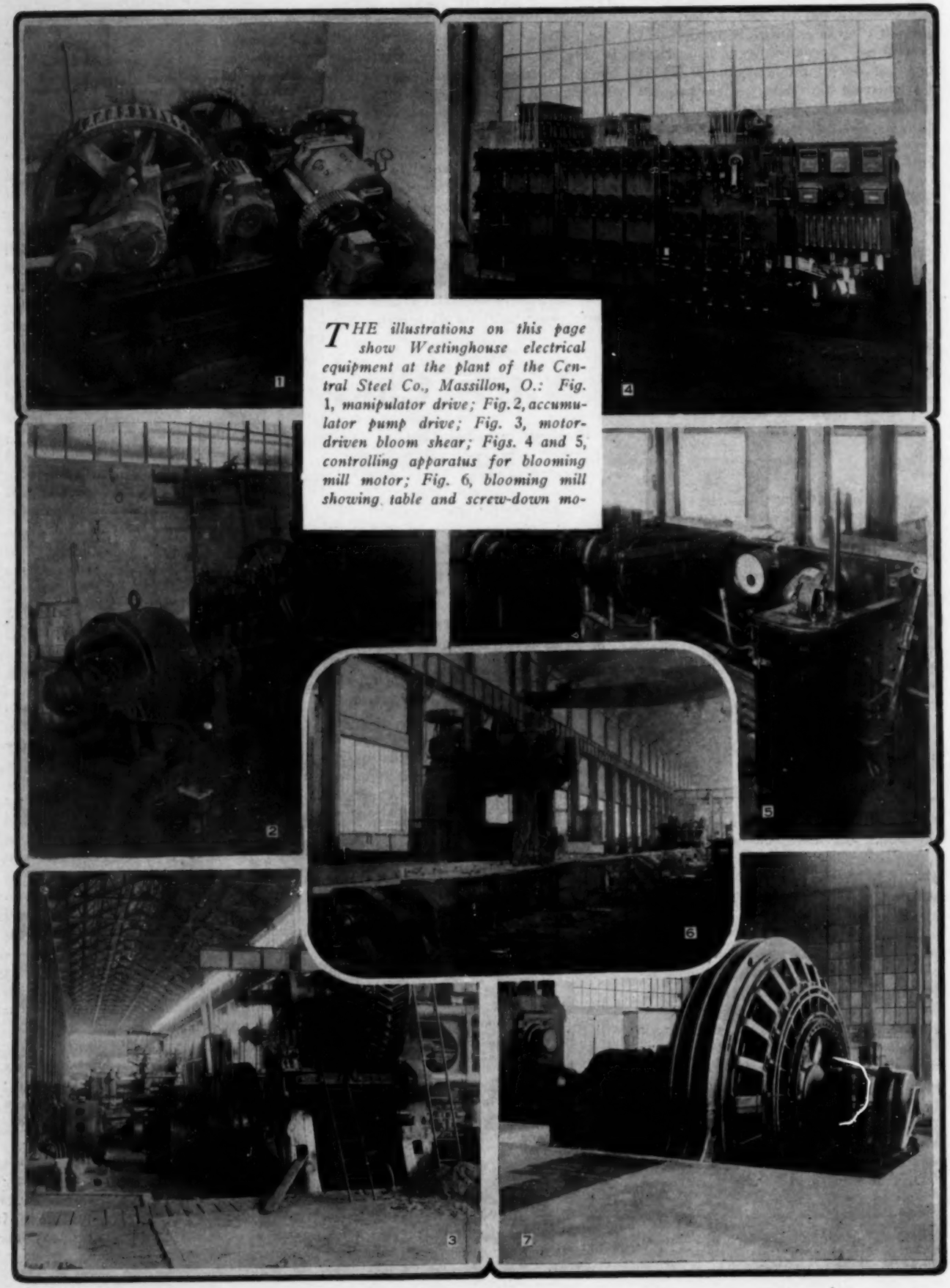
Nitre cake has an advantage for pickling purposes because it removes the scale efficiently without attacking the metal materially. In the case of wire which has been stored out of doors for a long period of time, and consequently has accumulated a good deal of rust, it is found that after the wire is pickled in nitre cake it is nearer to gage than when pickled in sulphuric acid. This is explained by the fact that the sodium sulphate has a cushioning effect and protects the iron. Nitre cake will not pickle steel in which there has been a segregation of carbon due to improper manufacture. It removes the scale but leaves the carbon. It will therefore detect faulty steel stock.

Nitre cake is now widely used for pickling purposes; it has as much if not more speed in pickling than sulphuric acid; it can be handled easily and does not burn the workmen. The cost of pickling per ton of steel is moderate.

It is used to pickle gun barrels, bolts and all classes of ordnance and munitions, and in every pickling operation where sulphuric acid may be used. It is used in pickling copper and brass and gives good results.

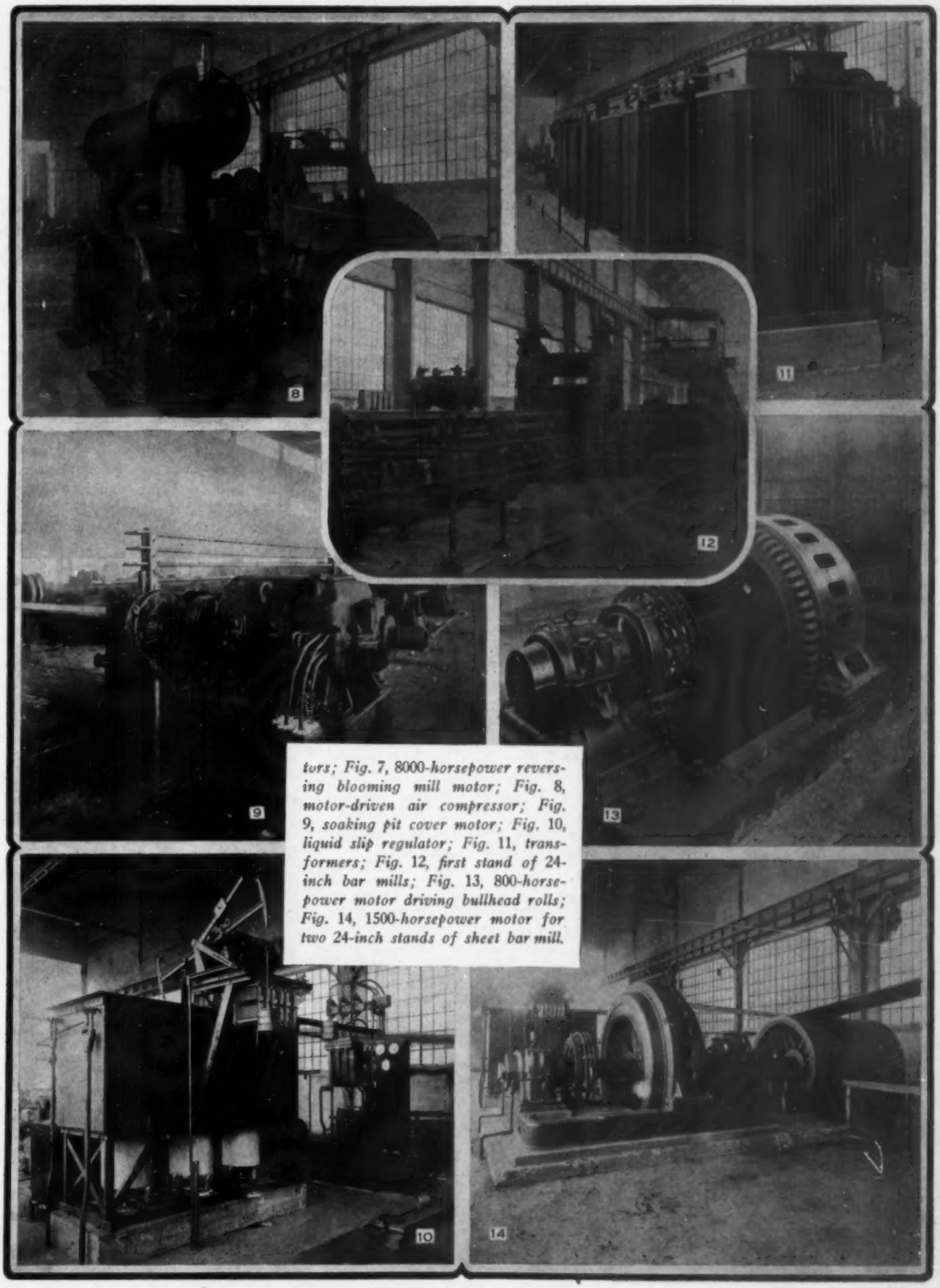
From a paper read before the Philadelphia section of the American Chemical society. Mr. Rhodes is a chemical engineer with the E. I. du Pont de Nemours Co., Wilmington, Del.

Electricity Spurs the Development of



THE illustrations on this page show Westinghouse electrical equipment at the plant of the Central Steel Co., Massillon, O.: Fig. 1, manipulator drive; Fig. 2, accumulator pump drive; Fig. 3, motor-driven bloom shear; Figs. 4 and 5, controlling apparatus for blooming mill motor; Fig. 6, blooming mill showing table and screw-down mo-

Rolling Mill Equipment of All Kinds



tors; Fig. 7, 8000-horsepower reversing blooming mill motor; Fig. 8, motor-driven air compressor; Fig. 9, soaking pit cover motor; Fig. 10, liquid slip regulator; Fig. 11, transformers; Fig. 12, first stand of 24-inch bar mills; Fig. 13, 800-horsepower motor driving bullhead rolls; Fig. 14, 1500-horsepower motor for two 24-inch stands of sheet bar mill.

Iron and Steel Technology—1917

Enormous Outputs During the Past Year Have Been Effected Largely by Concentration of Energies as New Developments Have Been Neglected Unless They Promptly Led to Labor Conservation or Expanded Production

BY ROBERT J. ANDERSON

BROADLY considered, conditions in the past year have not been conducive to much technical progress in the iron and steel industry, and all of the advances were of an orderly nature. It is not difficult to recognize the reasons for these conditions. Since our entry into the war, our national resources have been speeded up rapidly in every line of industrial activity, and such a state of affairs is generally more or less inherently inimical to technical progress. The steel business has witnessed tremendous activity, and with output of paramount importance technical matters have in many cases been sidetracked. In some instances where new construction has been made to enlarge capacity even in the face of greatly increased costs, the returns upon the investment have been calculated to be immediate with small consideration being given to earnings after the war—whenever that may be. With these salient features of the year at hand, it is apparent that time has been the most important factor, and broadly speaking, standard practice has been rigidly adhered to.

Completes Furnace in 57 Days

Quick construction may be cited in the case of the blast furnace blown in on July 3, 1917, by the Cambria Steel Co., which was completed in 57 days from the foundation. Actual production in open-hearth plants has, in many places, exceeded estimated capacity, hearth enlargements as well as sundry minor changes being contributory factors.

War demands and the increase of domestic consumption have had a far-reaching effect on the world's markets, and steel works projects are being pushed in the warring and in the few remaining neutral countries. The by-product coke industry of Japan is advancing with great strides, while even in Spain, the increasing difficulties of obtaining steel materials such as castings, forgings and special steel have necessitated plans for increased production by that country to care for its home needs.

Notwithstanding the demands made for output, the exacting requirements of United States shell specifications and the high grade materials needed for munition work should have an important effect on the quality of steels produced. In this connection, it may be remarked that the United States high-explosive shell specifications are so rigid as to exclude the employment of much good shell material. With enormous production of shells demanded, it would appear that the ordnance department should relax on the chemical-analysis requirements and accept stock more according to physical value, which classification characterizes French practice. This would make for increased production and also allow the use of much steel at present ruled out by specification.

No shortage of ore has been experienced in the past year, nor is any curtailment of the supply imminent as existing mines can readily supply the increased demands, ignoring the possibilities of new discoveries. Labor shortage and transportation difficulties are about the only factors that can restrict an increased production. From the technical aspect, developments in washing and concentrating sandy ores have been encouraging, the success encountered assuring further progress in iron ore dressing. Magnetic separation of low-grade iron ores, such as those of the eastern Mesabi and the well-known bodies of New York and New Jersey, could, if sufficient of the best milling machinery were installed, result in four times the present output from such ores being recovered. Large-scale workings such as have been applied so effectively to the porphyry coppers could likewise increase the present production of eastern ores.

Ore Production

The ore-dressing developments in 1917 had most to do with mechanical problems relating to the treatment of lean ores, and the increase of extraction by magnetic methods. Developments in mining proper have been chiefly associated with increasing the efficiency of methods for removing mined ore from pits and in hoisting it from shafts. The tendency toward electrification of iron ore properties has continued. The fact is familiar to all that large supplies of ore are now available but that the high-grade ores of easy access are rapidly becoming depleted. Hence, improvements which will engage the attention of the operators in the future will be in the direction of beneficiation of low-grade ore, the discovery and exploitation of new mines, and the enlargement of magnetic-separating operations. Advances will continue as iron ore dressing is still in its infancy.

The furnaces have had hard driving in the year just closed on account of the increased demand for iron, and the new year should see no let-up. Construction has been noted more for rapidity than for departures in design. The main trend has been in the direction of improve-

Summary of Past Year

LOOKING over the past year it is evident that the huge efforts expended by industry to produce the enormous quotas of iron and steel—a part of America's share of the war burden—have made heavy inroads on the time that would ordinarily be devoted to technical projects or new ideas. Improvements or inventions which will result directly in labor-saving devices or reflect themselves in expanded output, have, however, been greatly encouraged. Again, the shortage of labor and the scarcity of skilled workers, together with the negro migration from the south, have had no small effect upon the technical developments.

The results obtained by the industry in general, considering these handicaps and the inadequacies of transportation and raw materials have been impressive. What under normal conditions would have been considered impossible, has been achieved. The gigantic efforts expended have been inspired largely by patriotic motives and the wonderful results accomplished are impressive in revealing the rapidity with which American citizens can meet a national emergency.

ments to appliances of a mechanical nature, and in the activity as regards by-products. Highly manganiferous slags from steelmaking operations are being added to blast furnace burdens in order to raise the manganese content of the pig iron; charging basic slags of this sort allows a definite advantage. Furnace by-products such as slag and potash have been attractive, the latter in particular, although such may not necessarily be the case at all plants because the alkali content of the ore and stone determines the value of the potash recovery. The potash content of manganiferous iron ores appears to be a considerable source of the valuable by-product. In the main, mechanical invention has been the most active interest as regards the stack itself, and new appliances or improvements on older ones are rapidly entering every phase of blast furnace operation, thereby diminishing the number of employes and making the work safer.

A comparatively small amount of new blowing equipment has been installed, existing blowing equipment generally being remodeled for greater blast pressures. The addition of plate valves which allow increased piston speeds has permitted some plants to put in an additional stack without adding more blowing units.

Hot Blast Stove Practice

Present tendencies in hot-blast stoves are toward the building of three stoves per furnace—an arrangement sufficiently elastic to prevent any probability of discontinuing operations through the crippling of one unit. The best information points to the economy and efficiency of arranging stoves so that there are as few units as possible but of large size. Changes in furnace lines and fuel have made for the employment of higher blast temperatures, and the greatly increased demand for gas for power purposes and boilers has required more economical stove operation. The insulation of stoves and hot-blast mains with insulating materials of diatomaceous earth received much attention in 1917, although practically a new subject three years ago. Insulation of stoves, mains and bustle pipe is a forward step, and worthwhile economies can be effected by proper attention to prevention of heat loss by this means. In general the development as to stoves has been along the lines of increased capacity and a reduction in the number per stack, coupled with more attention to the details of scientific operation.

The advances in the use of metallurgical fuels in the past year were continuations of well-grounded tendencies of heretofore, with interest in powdered coal active, and with the natural gas situation becoming constantly more acute. The great problem now confronting the industry is the fuel problem, and engineers have had to consider fuels from a broad viewpoint. By-product coke oven plants increased markedly in 1917, and it is estimated that the production from by-product ovens is over 50 per cent of the total output of the country. If the present construction of new units is entirely completed early in 1918, the oven capacity should approximate 30,000,000 tons for this year. Progress has been attended with advances in the recovery of benzol. In fact the development of benzol goes on record as one of the most remarkable in chemical industry in the past three years. Practically every by-product plant in the country is now equipped for benzol recovery.

Natural Gas in 1916 and 1917

THE consumption of natural gas was greatly increased in 1916 and 1917 both in the home and for industrial purposes. In fact, at one period the demand entirely consumed the available supply which culminated in a general price advance and in some instances restrictive legislation For these reasons many plants were compelled to forego the use of this convenient fuel. In open-hearth furnaces it has been replaced to a large extent by coke oven gas and powdered coal. Crude oil, while a good fuel for open-hearth furnaces, is high in price

The theory that there will be no outlet for benzol and toluol when the war is over is receiving more credence than is its due. Admittedly, the war requirements are taking many of these products for picric acid and trinitrotoluol, but when the production for war needs no longer is necessary the outlet for these products will be largely in the motor-fuel field. About 10,000,000 gallons of toluol are now produced per year, but there appears to be no substantial ground for fear of impossibility of disposing of this output when hostilities cease. The war has unquestionably accelerated the growth of the by-product coke industry, but when it is considered that a complete by-product plant now costs over twice as much as it did a few years ago, it is unreasonable to think that the large investments throughout the industry have been made for war profits alone. The development in the main has come because the by-product process is here to stay by virtue of being more efficient than the wasteful bee-hive oven, and because it constitutes better business.

The consumption of natural gas was greatly increased in 1916 and 1917, both in the home and for industrial purposes. In fact, at one period the demand entirely consumed the available supply which culminated in a general price advance and in some instances restrictive legislation. For these reasons many plants were compelled to forego the use of this convenient fuel. In open-hearth furnaces it has been replaced to a large extent by coke oven gas and powdered coal. Crude oil, while a good fuel for open-hearth furnaces, is high in price.

Progress in Fuels

The use of powdered coal received much attention in 1917, and the development of this infant branch of engineering is progressing rapidly. Pulverization of low-grade fuel, like highly gaseous lignite, offers a field for research; powdered lignite has been burned under boilers on the Pacific coast in the past year without difficulty, and reports of experiments now in progress will be of value. The application of clean producer gas to industrial heating furnaces is likewise receiving consideration, some heat-treating furnaces having in the past year switched from fuel oil to producer gas. Interest in waste-heat conservation and utilization is active, and many waste-heat boilers have been installed in connection with industrial heating operations, such as heating and melting furnaces. The steel industry has recognized the importance of the application of its waste heat to steam generation, and in the past three or four years about 100,000 rated boiler horsepower has been installed.

The shortage of magnesite prevented basic melting in some instances, and the fact that Austrian magnesite has been unavailable has presented serious difficulties in obtaining suitable refractories for brick for furnace linings. A process has been patented to make a synthetic material, termed "magnesio-ferrite", which is said to have the unusual properties of the Austrian magnesite. The process patented calls for making a similar material from natural iron-free

magnesite by adding mill scale or iron ore. Magnesite from Stevens county, Washington, is being produced as calcined magnesite and the so-called magnesio-ferrite. The ore from this point runs to 95 per cent $MgCO_3$, with silica, alumina, iron oxide and lime low, and is said to be obtainable in large quantities.

The study of silica refractories is continuing to receive a great deal of attention as indicated by the number of articles in the technical and scientific press; a study of this subject is being continued by the bureau of standards in co-operation with the American Refractories Manufacturers' association and the American Gas institute. The new refractory zircomia, zircomium oxide, has been tested under conditions of service and promises to be a valuable addition to the present limited list of suitable refractories. Insulating bricks and insulating materials have found increased application, and great strides were made in insulating engineering. Speaking generally, efforts have been put forth to increase the thermal efficiency and to provide greater uniformity of heat in high-temperature apparatus. Insulating bricks have been employed for the insulation of hot-metal cars and mixers with a reduction of external temperature of these vessels, and in the former allowing for a larger radius of haul without chilling. The use of these bricks on hot-blast mains and bustle pipes enables better blast temperatures to be secured. Likewise many hot blast stoves have been insulated with a resulting better thermal efficiency.

In abrasives, an anticipated shortage is at hand, the transportation difficulties having affected bauxite shipments from Arkansas, and the power shortage at Niagara is serious. The large quantities of grinding wheels required in the manufacture of munitions for the government's war plans may make these materials difficult to obtain.

The Electric Furnace

The high prices for fuel, together with the uncertainty of delivery in 1917, gave substantial impetus to the increased use of electric-melting furnaces in steel plants. In addition to melting furnaces, electric furnaces have been utilized for heat treating castings, shells and tool steel. The war has been helpful in bringing the electric furnace into favor because of the demand for special steels for tools and dies and for special alloy steels for aircraft construction. A tendency has started, due in some instances to advantageous power rates or for geographical reasons, to replace crucibles and converters with electric furnaces. In the main, however, the production of steel by the newer appliance has been confined to special steels because the control of chemical composition may be readily maintained on successive heats.

Simple Design is Big Feature

Strong and simple design is the advancing tendency in construction, and with the class of labor now available it is essential that the furnace and its auxiliary parts be practically fool-proof. The future construction of exceptionally large furnaces points to the stationary type. Reversed duplexing for electric furnaces in steel foundries has been mentioned in the past year, and while this is believed by some metallurgists to be an ideal arrangement, no instance in practice has come to the attention of the writer, nor does there seem to be any necessity for so operating. In reversed duplexing, cheap scrap would be melted on a basic bottom where refining could be performed, thereby eliminating the sulphur and phosphorus; the molten metal would be transferred to an acid furnace which had previously been working on a charge of metal, the charges united, and the final deoxidation would be performed under an acid slag. Assuming that acid steel is better than basic, the question is whether the added costs of handling the steel and the additional power required would not be so great as to offset the gain through the cheaper scrap charged into the basic furnace. However, it is practically useless to compare well made acid with well made basic electric-furnace steel.

No progress has been made either in the United States or in Canada in producing electric pig iron directly from ore. A new field, however, has arisen for the electric furnace with the war and the unprecedented conditions brought about by it, namely the production of pig iron from shell scrap and turnings. A number of furnaces in the United States and Canada are devoted to this work exclusively. The process is not new as it was attempted a few years ago, but under the then prevailing market conditions it was not commercially practicable. The process is simply one of melting scrap and adding carbon so that the resultant iron has about 3 per cent carbon. The formulas are naturally regulated by market conditions. An excellent quality of low phosphorus pig iron may be obtained—because of the low phosphorus and sulphur requirements on shell stock—at an operating cost which makes for substantial returns on the high price of low-phosphorus pig iron.

The manganese situation as regards ferromanganese was unsettled in 1917 and developments may be looked for in substitute deoxidizers, or in methods for better utilizing this vital alloy. Brazil has been the heaviest producer of manganese ore since hostilities closed other sources of supply for the United States, and the American steel industry would have been in a perilous condition if it had not been for that country.

For a deoxidizer substitute to be acceptable it should be able to remove oxygen from molten steel and at the same time the resultant oxides must be readily eliminated; further, any excess of deoxidizer cannot be detrimental to the metal. The adoption of any substitute will probably be a slow process because of the general antipathy toward new and unproved materials, so that the only other probabilities open are the conservation of ferromanganese by using it more efficiently and the development of methods for better extraction from the ores themselves. The production of elemental manganese by electrolysis of the ore in a bath of fused salts awaits solution. The bureau of mines has undertaken an important research along the lines of increasing the manganese supply. The premelting of ferromanganese in large open-hearth plants has gained ground, this operation being performed in electric melting furnaces with worth-while savings in manganese—as much as 33 per cent. Mining of manganese ores has been active since our entry into the war, but the total tonnage of high-grade ore mined amounts to less than 20 per cent of the present requirements of the steel industry.

With increasing open-hearth production, 50 per cent ferrosilicon has been an active alloy, and its consumption has greatly increased. Too, the 75 per cent alloy has been in greater demand. A steady growth is being witnessed in the use of the ferrotitanium alloys for the deoxidation of steel, and titanium alloys are likewise being employed to partly replace manganese. Titanium alloys have proved their value as is shown by their large consumption both at home and abroad.

Tungsten and Molybdenum

The main employment of tungsten in the form of ferrotungsten has been as usual in the manufacture of tungsten steel for high-speed tools. Interest in tungsten metallurgy has centered in the dressing of the ores, and few ore-dressing processes have

advanced as rapidly as those for treating this type, particularly in the Colorado district. More interest has been displayed in molybdenum and ferromolybdenum in the United States; in Canada, a number of companies are operating on the production of molybdenite concentrates which are smelted into ferromolybdenum, and this product is exported under the supervision of the imperial munitions board of Ottawa. Flotation has been utilized successfully in milling. Noteworthy developments are in progress in an eastern United States mill where the concentrating capacity is being enlarged. The market for ferromolybdenum in alloy steelmaking has not yet been developed in the United States to any great extent. About 33 per cent as much molybdenum as tungsten is required to confer the desired properties on steel for tools. Prices for the former are, however, higher. New electric furnace plants for the production of ferrotungsten were added in 1917, most of which were equipped with facilities for making ferromolybdenum.

Ferrochromium was in higher demand in 1917 than in the year previous, but no unusual technical developments are on record. The importance of ferrochromium as an additive material in steels used for motor cars, armor plate, armor-piercing projectiles, and high-speed tools has been greatly increased since the war started; and by the same token, the cessation of foreign supplies of chromiferous ores has accelerated production in North America. The aircraft production board made plans for the design of the standardized government airplane motor which will require large quantities of the alloy for chrome steel connecting rods, crankshafts and other parts. The issuance of a late order by the priority officer of the war industries board forbade the delivery of chrome steel for the manufacture of pleasure motor cars.

Continued interest has been exhibited in ferrouranium for making uranium steel, used at present in Germany for big guns, and in the United States for high-speed tools. In big gun linings it is claimed that uranium steel is better adapted to withstanding rapid fire. Small lots of this material are to be tried by the bureau of ordnance of the United States war department for use in guns.

Steel Production Processes

Munition making has caused minor departures of insufficient note to dwell upon at any length, and, in the main, standard practice has been closely adhered to in the steel production processes. The production of shells from cast steel ingots by direct casting has been adopted more widely. Ingots have been poured one-shell high. The advantages of casting the rough forms rather than employing the method of rolling billets, shearing them to length, and finally piercing the shells, are self-evident. As yet, cost appears to have been the most important factor which has delayed the more general adoption of so-called hot tops in ingot-casting practice in the United States, but it is unquestionably necessary to employ these devices if the maximum of sound steel is to be cast. Many of the defects found in steel today are due solely to the tonnage striven for and it should be possible to eliminate many of the mechanical and metallurgical defects without injuring output by making an appropriate study of the problems.

No Advance in Bessemer Process

In the bessemer process, no advance is noted in the year just brought to a close, nor is any marked departure looked for as the process has been developed about as far as it ever will be. The use of roll scale as an additive agent to vessel charges, while not new, received some attention. The use of roll scale in the converter will, in general, improve the quality of the steel and at the same time increase production with lowered costs, as has been proved by experience. While the duplex process was firmly established as a rational process in 1904, it has not been until late years that its true worth has been widely recognized in the industry. The large output possible with minimum capital investment as well as the fact that it is independent of the scrap market have strongly intrenched this method. Shell rejections have been fewer from duplex steel than from straight open-hearth steel. It appears as though most of the large plants will employ duplexing for most of their steel production in the near future. Triplexing, that is, steel refining by the use of the bessemer converter, open-hearth furnace and electric furnace, is making gains where special steel is to be made.

Rail failures of late continue to exhibit a decrease per 100 miles of track rolled, and the tendency continues toward heavier rails—one of the leading roads has ordered large tonnages of rails up to 130 pounds per yard. A late contribution to the rail-failure literature on transverse fissures goes to show that such fissures result from road conditions rather than from the methods of steel manufacture; railroad engineers, however, continue to call for better steel. It appears as though this subject must be further studied if it is to be disposed of for all time.

A large volume of manufactured products and new installations either completed or under contract have been the most noteworthy features in the application of electricity in steel mills. The sentiment in favor of the electric drive for reversing mills is indicated by the estimate that there are at least 21 sets of equipment either in operation or contracted for at this writing, where there were only two or three installations two years ago. Nor is the application confined to reversing blooming mills; included in the above are a billet mill and a 3-high structural mill.

The steel and cast iron foundry business enjoyed a successful year, unmarked by anything special other than the change in attitude of foundrymen toward the electric furnace as a melting medium. The electric furnace where employed in the foundry is utilized mainly for melting steel scrap for steel castings. There are only a few instances on record where malleable iron has been melted in an electric furnace. However, information on this subject may soon be available as a new plant under construction will shortly do such melting and on a large scale. Some plants have secured better results in the electric furnace than in the converter for small castings, and the operating costs of the two processes are dependent upon geographical location of a given plant and the power rates; the farther a plant is located from its source of low-phosphorus pig iron the greater the advantage in favor of the electric furnace due to the freight rate.

Laboratory Equipment

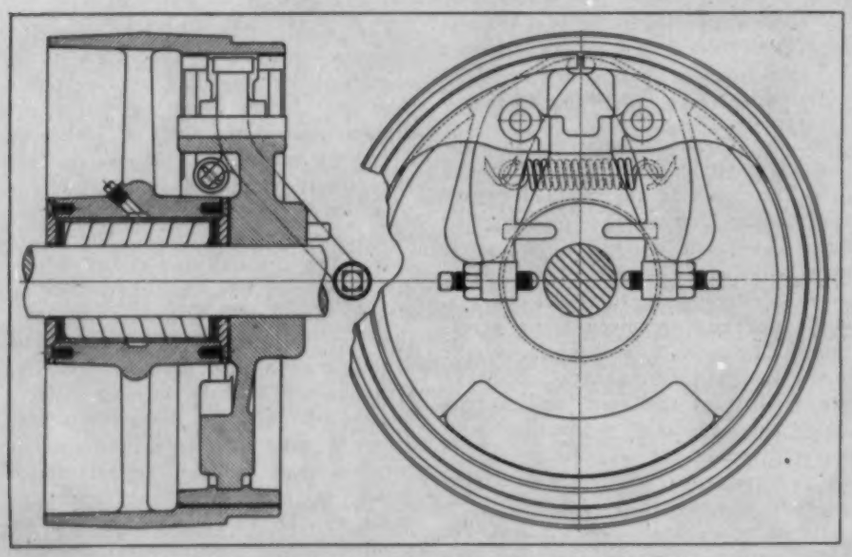
Since the war started, much iron has been in demand for making industrial chemical equipment such as retorts, dryers, sulphonation kettles, and the like; considerable technical progress in methods of manufacture aided by scientific laboratory control has been witnessed. High-silicon acid-resisting metal has also been in demand for chemical apparatus. The method of making cast iron shells in permanent iron molds has enjoyed much publicity. There is nothing new in the employment of such shells for warfare, and France is now making more than 1,000,000 cast iron shells daily casting, however, in sand. Germany, is is reported, is casting in

permanent molds. The present war has demonstrated their effectiveness against trenches because of their better fragmentation, and if our government uses these shells, foundrymen will have another problem to grapple with. Cast iron and steel briquettes have not had any wide use to date, nor has there been much progress in this direction, but they appear to have a definite future in foundry melting as their employment manifestly should result in economies.

Testing and Pyrometry

Metallography enjoyed a good year in 1917 to judge from the sales of equipment by the instrument makers and by the increasing interest manufacturers have displayed in this method of control. The movement is now going forward under its own impetus. Rational methods of scientific control by means of metallography have done much in recent years to establish sane procedure. An important forward step in testing methods for steel is the Burrows magnetic test. While possessing no great practical use at the present writing, the basic fact that there exists a definite relation between the mechanical and magnetic properties of steel has been established, and this means that the commercial testing of steel by the magnetic method is assuredly promised. Dr. Burrows' method of determining the properties of steel without testing to destruction should be extremely valuable.

Pyrometry has broadened its scope and usefulness in the steel industry, and the necessity of pyrometric control is by this time well understood. Future developments will be in the direction of the simplification of appliances, and along the lines of automatic temperature control. The recent work of Burgess on temperature measurements in open-hearth and casting practice has demonstrated that no unsurmountable difficulties are encountered in the measurement of furnace and ingot-teeming temperatures; the measurement temperatures of bessemer-converter charges does not appear practicable by pyrometry devices at present. The control of furnace and casting temperatures is desirable in many cases, because, as is well known, the properties of the finished steel are closely dependent upon these temperatures. Ordinary optical methods of pyrometry may be readily employed with a comparatively high degree of accuracy. Steel plants could undoubtedly improve their practice by employing pyrometric control of this nature, and be sure of better quality of product.



AUTOMATIC ROLLER BEARING FRICTION CLUTCH

Interest in the special steel has been centered in the wider use of these materials, and the metallurgical activity in this field has been in the direction of improvements in the qualities of the steels by heat treatment. Because of the advance in tungsten prices, a new permanent magnet steel (described about three years ago) containing chromium, has been tried as a substitute for the older tungsten steel. This steel, containing about 0.90 per cent carbon and 2 per cent chromium, is an acceptable substitute. The use of manganese steel for rock-crushing machinery and other special purposes requiring a steel of great ductility and great hardness has gone on apace, while a low-manganese steel of 1.25 per cent manganese content has found further use for rifle barrel stock. The value of low-manganese steel has not been widely appreciated nor has sufficient attention been directed toward their utilization for specific purposes.

Nickel steel has been used for many of the rifle barrels manufactured of late, and some machining difficulties have been experienced. Chromium-nickel steels have been going into motor car and airplane engine construction in increased quantity, while there appears to be a good future for nickel-chromium-vanadium steels in heat-treated castings; this steel has found increased application in light deck-plate armor and in gun shields. The vanadium steels, that is, the ternary carbon-vanadium steels, maintained their establishment for pneumatic tools such as chisels and rock drills, and as castings for locomotive frames. Copper-bearing steels have been used by the Germans in the present war for shells—certain ones fired were analyzed and found to contain 1.50 per cent copper.

Some further publicity has been given to the use of boron in steels, and recently the use of powdered ferroboron was recommended for case hardening; the results are reported to be similar to those obtained by case hardening with carbon. Many shops have practiced economies in high-speed steel in the past year by welding short tips of the alloy steel to carbon-steel shanks, while the so-called stellite has also been welded in a similar fashion.

An Automatic Friction Clutch

Several features are embodied in a new countershaft clutch recently brought out by the Accurate Machine Co., Cleveland. The new clutch has a large friction surface, an automatic self-tightening ring, and is fitted with a roller bearing. Essentially, the clutch consists of a pulley, friction ring and spider. The friction ring is driven and supported by the spider. Slots in the spider on each side of the driver allow sufficient space for the operation of the clutch fingers. The driver occupies the space between the two lugs cast at each side of the split on the friction ring, and bears on either lug. Both clutch fingers are supported on pins which are mounted in the lugs on the friction ring.

Operation of the clutch takes place as follows: As the thimble forces the fingers apart and the other ends of the fingers act against each other, the pins serve as fulcrums, thus enabling the friction ring to expand out against the friction surface of the pulley. It is said only a slight pressure is required to force the thimble

between the clutch fingers, and once that this is done, the tightening of the clutch takes place automatically.

Germans Use Chrome Steel for Magnets

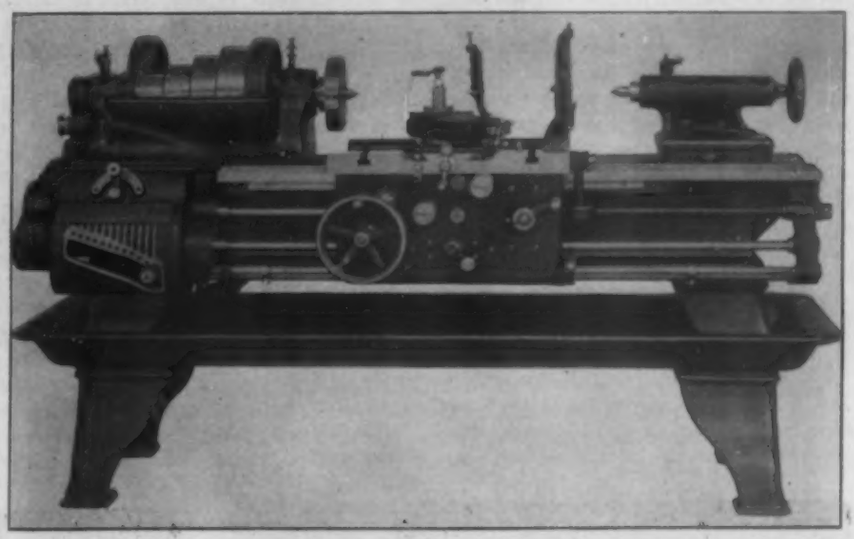
In the report of the German Imperial Physico-Technical institute for 1916, it is stated that 37 alloy steels with varying contents of carbon and chromium have been experimented upon, and a substitute for tungsten steel found for making magnets, all the available tungsten had been commandeered by the German government for war purposes. Though not so good as tungsten steels for the purpose, the report says that the chromium steel selected has given satisfactory results equal to those of the more common tungsten steels.

New Quick Change Tool Room Lathe

A new 16-inch quick-change toolroom lathe is being built by the Rockford Tool Co., Rockford, Ill. In designing the new lathe considerable effort was expended in reducing the number of controlling levers to a minimum. The headstock is heavily ribbed and securely clamped to the bed to prevent chatter. The bearings are of phosphor-bronze of generous proportions. End thrust is taken up on the rear bearing by large thrust ball bearings. Draw-in attachments and collets up to ⅞-inch in diameter may be used in the spindle. The tailstock is of the cutaway type and permits the use of the compound slide at right angles to the cross slide. For convenience in drilling, the tail spindle is graduated. The carriage is of liberal length, gibbed and scraped to a bearing. The cross thread gage stop has micrometer adjustment. A graduated chasing dial is furnished which enables the operator to chase all threads without stopping the lathe.

The apron is of double construction and all gears and studs are supported at each end, so that the possibility of cramping the bearings is reduced to a minimum. The gears are drop forged steel. Both longitudinal and power feeds are engaged by means of friction drives. A positive lock has been provided in order to obviate any possibility of the lead screw and feed rod being engaged at the same time. A feature which is believed to be of especial advantage in the production of a large number of duplicate parts is the automatic stop arranged so as to stop the carriage when traveling in either direction when feeding or screw cutting operations are being performed. Double the number of working speeds for the spindle may be obtained owing to an arrangement which permits both speeds of the countershaft to be utilized.

Special equipment includes a taper attachment, a relieving attachment and draw-in attachments and collets. The taper attachment has a top or adjusting slide which swivels its full length on the bottom slide. It is bolted to the latter at both ends. The slide is graduated on one end into inches per foot and degree; on the other end, it is graduated into thousandths of an inch up to three inches. Designed for the purpose of backing off or relieving teeth of hobs, cutters and similar tools, the relieving attachment is driven from the back gear through a quadrant clamped on the lathe bed. The tool-rest top slide is given a reciprocating movement by means of cams. Relieving and taper attachments may be used together.



TOOL ROOM LATHE ADAPTABLE TO MANY USES

The specifications of the lathe follow: Swing over bed, 16¾ inches; swing over carriage, 9⅞ inches; distance between centers, 32 inches; width of bed, 15 inches; length of carriage on bed, 24 inches; countershaft speeds, 150 to 205; threads per inch, 1½ to 80 (including 11½); feeds, 6 to 320 per inch.

Business and the Metric System

Better business, freer intercourse, and greater amity are expected to result from the adoption of the metric system universally among nations, according to a paper read by Justin W. McEachren before the American Metric association at Pittsburgh on Dec. 29. The platform of the association, as stated in this paper, advocates the international standardization of sizes, an international system of weights and measures, an international standard of currency and exchange, and international merchandising and banking methods.

The assertion is made that the adoption of the metric system is opposed by some by reason of the three factors, cost, confusion, and disturbance. Confusion and disturbance are stated to be worthy of note only as they directly affect cost. So cost is the factor dealt with at length in this paper.

A compromise measure to secure agreement between the opponents and the advocates of the metric system is proposed. The advocates of the metric system agree to sanction nothing that will disturb or confuse the work of engineers, designers, draftsmen, or skilled workmen. Present sizes and mechanical equipment are to be unchanged; all old standards and gages are to remain the same. In consideration of this agreement, the adoption of the international metric system by American industry is asked.

This agreement is expected to remove objection to the metric system on the ground of cost, as production will be in no way affected. It is believed that methods of sale, delivery and payment will be improved by this adoption, and the ultimate result hoped for is some world-wide system of weighing and measuring, a world-wide standard for paying and a world-wide method of remitting payment. Our own present currency system is proposed for use. The present wide acceptance of the American dollar seems to lend encouragement to the hope that it may at some time become the world's standard.

An Electric Furnace of New Type

A Description of an Electric Melting and Refining Furnace Recently Installed at the Midland Electric Steel Co., Terre Haute, Ind.—the Tilting Mechanism and Current Control Are Given Special Attention

AN ELECTRIC steel furnace, which has been used to manufacture basic carbon steel and low phosphorus pig iron, has been developed by the Booth-Hall Co., Chicago. The furnace is built for use on single, two and three-phase power lines. The single-phase furnace employs an auxiliary electrode, a main electrode, a conducting hearth and a cast-steel grid built under the hearth. The two-phase furnace has two main electrodes and two grids, while the three-phase type has three main electrodes and one grid. The furnace for single-phase operation is built only in the smaller sizes as a single-phase load of any considerable size cannot be handled by the average power house. Three-phase operation is employed only in the larger capacities where the increased number of electrodes tends to facilitate melting down and refining. The two-phase type of furnace has been designed for general use.

The furnace shown in the accompanying illustrations was recently placed in operation in the plant of the Midland Electric Steel Co., Terre Haute, Ind. It has a capacity of 3 to 5 net tons and is supplied by two single-phase transformers each of 600-kilovolt ampere capacity. They are connected to a 13,200-volt, 60-cycle, three-phase power line and deliver current to the furnace at 125 volts, secondary. A special switch is provided for cutting the voltage in half when refining or holding heats. The electrodes are automatically regulated and by proper manipulation of the electrode regulators and the voltage reduction switch, it is said to be possible to deliver any fraction of full power to the furnace. The furnace operates at about 90 per cent power factor, giving a power input at full load of from 1000 to 1100 kilowatts.

How Furnace Operates

Scrap steel ranging from machine shop turnings to heavy melting steel is used for charging the furnace. After charging, the auxiliary electrode and the two main electrodes are let down until they rest on the scrap. A pawl on the auxiliary electrode holder is now released which allows the electrode to rest of its own weight on the charge. The main electrodes are next drawn up and an arc created under each electrode. The arc is governed by the automatic electrode regulators which are designed to assure a uniform power input and a properly balanced load in the power lines. Heat generated by the two arcs from the main electrodes is conducted to the scrap, the auxiliary electrode acting as a common return. Since the auxiliary electrode rests on the scrap, no arc is formed under it.

When a pool of molten metal has been formed on the hearth sufficient to make it conductive of electricity, the current begins to flow through the hearth and out through the two steel grids imbedded beneath the hearth. This flow is recorded by the ammeters. The auxiliary electrode is then drawn up, out of contact with the scrap, and forms its own seal of the electrode opening in the roof of the furnace. The furnace then continues to operate two-phase with two independent circuits. On a cold bottom it is said that the auxiliary electrode is used for about 45 minutes; on a furnace which has been shut down over night, from 20 to 30 minutes, and on a hot furnace not more than 10 minutes.

As shown in Fig. 1, the furnace is spherical in shape with a saucer-shaped bottom. The roof is built of standard silica shapes which were used in place of specially designed brick, in order to save time on brick deliveries.

The furnace shell is made of ½-inch

FIG. 1—FRONT VIEW OF THE FURNACE

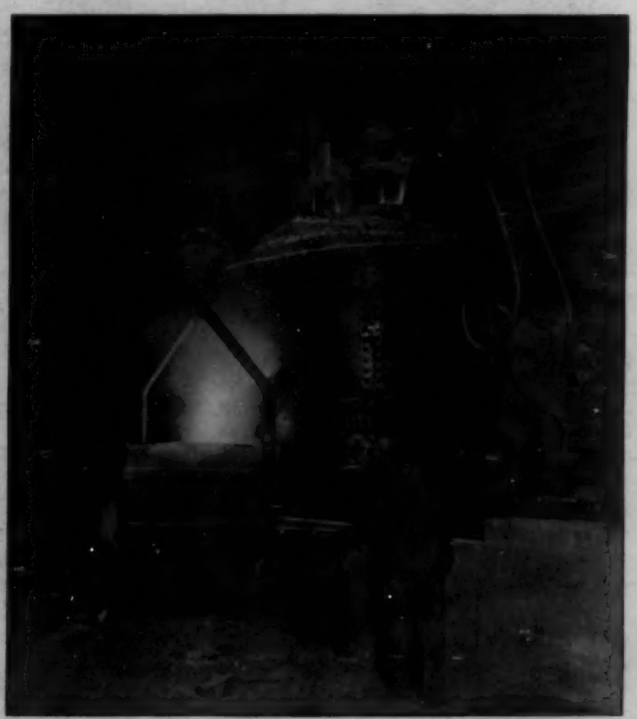


FIG. 2—FURNACE SLIGHTLY TILTED FOR POURING

riveted steel plate. The main electrodes are on opposite sides of the furnace, while the auxiliary electrode is directly alongside one of the main electrodes, and toward the front of the furnace. The tilting mechanism is placed in the rear of the main furnace pit so that no tilting machinery is located directly underneath the furnace. The furnace slightly tilted for pouring is shown in Fig. 2.

The furnace may be lined either basic or acid, the one at Terre Haute being lined basic. The hearth is 24 inches thick and the grids are 18 inches below the top of the hearth. The hearth is composed chiefly of either magnesite or dolomite and is solidly sintered in, layer on layer. From the hearth up, the walls are brick. The first three rows which reach above the slag line are magnesite brick and the remainder silica brick. The door for charging and slagging is placed in the rear as shown in Fig. 3.

The electrode clamps used with this furnace consist of three segments, one of which is solidly bolted to the center, or main frame, while the other two are pivoted on outside frames, one on each side of the main frame. This allows the electrode to be clamped or released by turning a lever at the edge of the furnace. By pivoting two of the segments, a play is secured which tends to take up any inaccuracy in the diameter of the electrode. The clamps are 16 inches in length and give a long bearing on the electrode. This is designed to minimize the tendency for the electrode to crack or heat at this point. Each segment of the electrode clamp is thoroughly water cooled.

The furnace rocks either forward or backward upon 100-pound steel rails which are bolted to the concrete foundation piers. Three lugs are bolted to each rail, and extend over the rail and mesh with slots in the tread casting, which is bolted to the side of the furnace. The tilt is controlled by an A-frame which is cross braced and extends down into the main pit on each side of the furnace. The frame is connected under the furnace by a strut. To this strut is attached a second strut extending back into the furnace pit and furnished with a rack which engages the operating gears. The gears are actuated by a motor, the controller of which is placed at the front of the furnace platform. In an emergency the gears can be operated by hand.

The substation, as shown in Fig. 4, may be placed either directly back of the furnace or to one side. In the installation at the Midland plant, the substation is placed directly back of the furnace.

The switchboard for operating these furnaces is usually furnished with a watthour meter, or two voltmeters and two ammeters, one for each electrode. The Terre Haute installation is also furnished with an indicating wattmeter and power factor meter. The voltage reduction switch, developed for use with these furnaces, consists of six single-pole, double-throw knife switches mounted together and operated by one lever.

This furnace began to operate in December, although the Booth-Hall Co. was not formed until late in June, 1917. In the ensuing period, designs were perfected, the furnace built, installed and placed in operation. This type of furnace is built in the following sizes: 1500 to 2000 pounds, 3000 to 4000 pounds, 3 to 5 tons, 6 to 8 tons and 10 to 12 tons.

William K. Booth, the designer of the furnace, was identified for several years with the Snyder Electric Furnace Co. Julius R. Hall, who has been associated with Mr. Booth in developing the mechanical details, has occupied positions as designing engineer with the American Bridge Co., the Strauss Bascule Co., the Brown Hoisting Machinery Co. and the Snyder Electric Furnace Co.

FIG. 3—REAR VIEW SHOWING CHARGING DOOR

FIG. 4—A VIEW IN THE SUBSTATION

War Demands Drive Tool Builders

Shop Capacities Greatly Enlarged at Beginning of Year Prove Inadequate to Meet Specialized Demands Put Upon by Government for War Production—Commercial Orders Set Back—Prices Rise Steadily

NINETEEN hundred seventeen long will be remembered in the machine tool industry, for during this year the industry was placed under stress as never before. The government's hurried preparations for war created a demand for tools and still more tools. The necessity for manufacturing munitions of all kinds on a scale commensurate with the plans for placing America's millions in the field, opened up many new fields of enterprise requiring equipment. While industries were chosen for war work, the peace-time occupations of which best fitted them for this new work, the machinery requirements have been far beyond the capacity of builders. The making of ordnance, shells, airplane engines, trucks, mines and ammunition; the building of a vast fleet of cargo ships and all other mechanical equipment; the submarine destroyer program; the equipment of large railroad shops, arsenals and repair shops in France; the replacement requirements of steel producers and railroads; and numerous other sources of demand might be mentioned. All these have poured into the machine tool and crane markets in the past nine months.

The year 1916 and most of the year 1915 had been periods of capacity operations in the machine tool industry and the year 1917 was begun with a capacity to produce tools greater by far than ever before in the history of tool making in the United States. Even this enlarged capacity has been unable to cope with the unprecedented demand thrust upon it. The right of the government to preferred deliveries over all other orders was recognized from the first, and builders did all in their power to meet the increasing demands, but many conflicts soon began to arise between orders from the war, navy and other government departments, each of which considered its needs most important. Finally, the war industries board added a machine tool division to straighten out the tangle and supervise the filling of the government's needs. Special priority ratings were given machines needed for various purposes. Under a Class A priority, were placed machines needed for work on the submarine destroyers, for ordnance manufacture and airplane engine plants. Under class B rating, came machines needed for work on cargo ships; machines needed for less important uses were given lower ratings. Every effort has been made by builders and by the government, which has fully appreciated the situation, to put each machine turned out in the place where it was most needed. As the year closed, at least 90 per cent of the tools being manufactured were for direct use in connection with the war preparations.

War Doubles Prices

UNPRECEDENTED price advances have characterized the machine tool market since the beginning of the war. Carried on by the impetus of heavy previous buying, the market during the major part of the past year continued its upward trend. With the fixation of prices on raw materials by the government, however, this advance was arrested. In the main, prices since the beginning of the war have advanced as follows: Heavy planers, $2500 to $4400; heavy lathes, $1275 to $5650; horizontal boring mills, $1250 to $4250; vertical boring mills, $3600 to $7200; shapers, $425 to $775; milling machines, $825 to $1700, and grinders, $1250 to $2500.

When 1917 began, shapers were sold up five to six months, planers were scarce in all sizes, it being difficult to get any of these tools in less than six months. Universal grinders were scarce and sold up to May or June; autmatic tools of various kinds were sold up five or six months ahead; and plain and universal milling machines to July. There were plenty of single purpose lathes available, but the standard makes of lathes were pretty well sold up in all the small sizes. On other tools, however, the market was less booked ahead. Deliveries could be had in three to five months on 20-inch and larger lathes. Radial drills are sold ahead about two months. High speed drilling machines could be had for delivery in two or three months and upright drilling machines in less time.

But the special work of war has caused a shifting of demand for machine tools. Due to additional capacity constructed this year, night operations and concentration of builders on special types and sizes, deliveries of some tools have been cut down. Shapers and milling machines now are obtainable in three to four months. But the demands of ship builders and engine and motor manufacturers have pushed deliveries far in the future on heavy tools despite these expedients. Lathes over 24-inch, vertical and horizontal boring mills, 36-inch and up, have become exceedingly scarce. Some makers of these tools are out of the market for 1918. Deliveries on some makes of radial drills also have been pushed forward in some cases to six and eight months. The equipment of the new Fore River Shipbuilding Corp. destroyer plant absorbed the entire output of one radial drill manufacturer for five months. Small lathes, some makes of universal grinders and some upright drilling machines can be bought out of stock.

Prices advanced steadily all year until Oct. 1. At that time material prices were fixed by the government, which helped the situation somewhat. However, present quotations show a decided increase as compared with those of a year ago. Lathes have advanced about 30 to 35 per cent; planers, 50 per cent; shapers 35 to 40 per cent; radial drills, 35 per cent; boring mills, 40 to 45 per cent. These statements, of course, apply to the whole industry, prices and deliveries varying with different makers.

As time has been the essential element in machine tool purchases the past year, the market for used equipment has received considerable impetus. In many cases the prospective buyer has shown he preferred a second hand tool in good condition which could be shipped immediately to a new tool on which he would have to wait several months, even though the price of the used tool approximated that of the new tool. One case is cited where 15 24-inch engine lathes, after 16 years' continual service, sold for approximately $400 more than they cost new. In another case, a universal grinding machine, purchased for $900 in 1897, was sold a short time ago for $1700.

Canada Will Build Ships

Adopts Definite Plan for Government Construction—Plate Mills to be Built—Big Expenditures for Munitions Laid Out

TORONTO, Jan. 7.—Canada has adopted a definite plan for building ships under governmental control, according to C. C. Ballantyne, Canadian minister of marine. The government has decided to utilize the full capacity of Canadian shipyards in producing modern steel cargo steamers of the approved types. These vessels will sail under Canadian registry. The productive capacity of the shipyards of the dominion is estimated at from 275,000 to 300,000 tons annually. During the continuance of the war, and for some time afterward, the construction of steel ships for foreign registry will not be permitted. The naval construction branch of the marine department is working out the details of the program which calls for the construction of three types of vessels; one of approximately 3000 tons which may be built in shipyards situated on the Great Lakes, another of from 5000 to 7000 tons and a third with a deadweight capacity of from 8000 to 10,000 tons. Owing to the difficulty of obtaining plates and shapes, it is stated that negotiations are under way to establish mills for rolling this material in sufficient quantities to meet maximum requirements. The shipbuilding program will involve the expenditure of between $50,000,000 and $60,000,000 a year.

Mr. Ballantyne has made public the following details of the government policy:

1. The ships will be built and owned by the government. The policy inaugurated is one of government ownership of ocean transports.

2. The ships will be operated, partially at least, by the government, although some may be chartered by responsible parties.

3. No new shipyards will be established at present but the existing shipyards will be utilized to their fullest capacity. The main yards are the Vickers, Montreal, Que.; George Davies, Levis, Que.; Polson Iron Works, Toronto; Collingwood Shipbuilding Co., Collingwood, Ont.; Port Arthur Drydock & Shipbuilding Co., Port Arthur, Ont., and the yards on the Pacific coast.

4. Ships now under contract for the British government will be completed. These were let by the imperial munitions board. These ships will be finished early in the summer and after that time. Canada will undertake all construction. It is felt that if Canada provides the finances she should exercise control.

5. There will be an equitable distribution of labor between the various plants in order to secure the maximum efficiency.

6. Charles Duguid, the government's naval architect, will be the technical officer in charge of the work.

7. Rolling mills to make plates will be located in Canada. Heretofore all steel of this kind has come from the United States, but in order to meet this program, mills will be located in connection with the plants at Sydney and New Glasgow, N. S., and Hamilton and Sault Ste. Marie, Ont.

The munitions industry is to be continuously active during 1918. The imperial munitions board at Ottawa has laid out a program involving an outlay of $30,000,000 per month, which may be considerably increased. Of the present monthly outlay $25,000,000 by way of imperial credits are furnished by the Canadian government and $5,000,000 by the United States for material purchased there for the production of Canadian munitions. The present output mainly is 4.5-inch and 6-inch high explosive shells, and shrapnel, and it is understood that orders now on hand will keep the plants working to capacity for some months. Since the renewal of activity in shell manufacturing some of the establishments in Toronto, which had laid off their female employes, have taken on a number of women and girls, but at wages considerably lower than those formerly paid. Also they are showing more discrimination in only employing those who are strong enough for the work.

The annual financial statement of the Dominion Bridge Co. of Montreal for the year ending Oct. 31, shows a considerable falling off in profits, the net amount available for distribution amounting to $1,186,436, against $2,762,289 in 1916, a decrease of 57 per cent. This is partially accounted for by the deduction of the excess profits tax before the profits were brought forward, which was not done last year. Moreover, the returns from the successful completion of the Quebec Bridge contract are not included in the present report. President Phelps Johnson in his report says: "On the acceptance of the bridge by the Government a distribution of profits should be made, and your company will then receive about $1,500,000 as its share of the profits accumulated in the seven years the work has been in progress, and will also benefit by the return of a good portion of the cash capital invested in the work."

With regard to munition contracts, which were the main basis of the company's activities for the past two years, with disappointing results, President Johnson states that the prospects for remunerative business in this line not being encouraging, work has been looked for in other directions, and contracts for marine engines and boilers have been secured to the total value of about $1,170,000. Orders for ship plates and frames have also been secured, which will keep the structural departments of the Lachine and Toronto shops busy for seven months to come. President Johnson intimated that there was some doubt as to whether the present 10 per cent dividend rate would be maintained, owing to the general increase in the cost of labor and material involving larger cash investments, deferred payments for munition work, and anticipated new legislation as regards business profits taxation.

Canada's Mineral Output

The department of mines estimates the production of metals from Canadian ores in 1917 as follows: Gold, 17,000,000 ounces; silver, 23,500,000 ounces; copper, 113,000,000 pounds; nickel, 84,800,000 pounds; zinc, 31,000,000 pounds. The production of pig iron was about 1,186,000 short tons and steel ingots and direct steel castings, 1,735,000 short tons. The production of coal was about 14,100,000 short tons. The production of gold, silver, copper and coal was less than in 1916, while the production of nickel, lead, zinc, pig iron and steel was greater than in the previous twelve months. Higher prices received for silver, coal and other products considerably enhanced the total value of the mineral production. This is estimated to have been not less than $200,000,000, as compared with $177,201,534 for 1916.

Double tracking of the Birmingham Southern railway, it is thought will facilitate development of the Fairfield works of the Tennessee Coal, Iron & Railroad Co. A franchise has been granted by the city commission of Birmingham and products for the big steel works will be handled more easily when the project is completed.

Metals Respond to War Factors

United States as Belligerent Exercises Firm Control Over Production and Fixes Some Prices in Behalf of Itself and Its Allies—Hears Market is Unusual and Follows Irregular Course

ENTRANCE of the United States into the world war found a greater reflection in the nonferrous metal markets than has any other factor since the outbreak of hostilities almost three and one-half years ago. The United States government now has become the principal buyer of copper, lead, spelter, aluminum, antimony and other metals. But its entrance to the market has been attended by far different effects than followed the buying by the allied governments within the past three years. They bid against prosperous domestic manufacturers at a time when industrial activity was most keen, the resulting demand exceeded supplies and prices were forced to unprecedented levels. But the United States government has assumed firm control of the metal-producing industries. Where it found production apparently insufficient, it fixed prices and regulated deliveries. However, this has not been necessary except in a few cases, particularly copper, aluminum, and for a time lead. The readjustment of the nation's industries from a peace to a war basis has reduced to a great degree the consumption in ordinary commercial work and this condition has resulted in an extremely dull situation in most metals during the past nine months.

Copper Prices Are Fixed

The copper market opened the year 1917 at 28.75c, delivered, for carload lots, electrolytic. As the year progressed prices steadily advanced, until in March the price reached 36c. Dullness prevailed during the early months, largely due to the prolonged absence of the British government from the market, which had bought 440,000,000 pounds in September, 1916, covering its early 1917 requirements. When the United States entered the war, however, the British government awaited the former's plans. Finally it was announced the government would act as purchasing agent for itself and all the allies. Labor troubles began to develop at mines and smelters during the summer and production dropped sharply in July and August. The strikes were settled, with the help of the government, and in the autumn the production began to pick up. For a time it looked as though the supplies might be insufficient to meet all war demands. In October, after prolonged consideration the war industries board and a committee of leading copper producers entered into an agreement fixing a maximum price of 23.50c for all grades of copper. At the time of the report the market was about 27.50c. During October and November no new contracts were entered into by producers to commercial consumers, due to the scarcity of metal. But by December supplies had increased to a point where the war demands were taking only about 70 per cent of production, and deliveries were being made to nonessential consumers. Provision was made for the needs of the small consuming trade by the war industries board, through the granting of a 5 per cent commission to jobbers on less than carload lots. This brought the price on such lots to 24.67½c. As the year closed the copper market was on a fairly even keel at the fixed price.

The energies of the brass trade have been devoted almost entirely to war work. Consumption of brass for ornamental purposes has ceased, due to the falling off of building construction. Brass mill demand for spelter has become almost nil except where government requirements are concerned. The galvanizing trade, which suffered a severe setback two years ago, due to the high prices of spelter, is now not more than one-third of normal. Consumption of galvanized products now is retarded by the scarcity and high cost of steel. With the two main avenues of consumption thus affected, the spelter industry has not prospered this year. Production has steadily exceeded demand and large stocks have accumulated, aggregating over 46,000 tons on Oct. 1. They now probably are much heavier. Several large smelters closed down during the latter part of the year. By the close of December probably one-third of the country's smelting capacity was idle. The market for prime western smelter opened at 9.75c, St. Louis, at the beginning of January, 1917. In February and March demand improved and prices advanced to about 10.50c, St. Louis. Following the declaration of war, in April, demand dwindled and no really active buying followed during the year. The government's purchases of prime western were negligible, although it closed for some moderate lots of Grade A and Grade B spelter. For a time, supplies of spelter were bought for the government by the subcommittee on zinc of the council of national defense, but after the enactment of the Lever act this work was taken over by the navy department. The price of prime western for prompt shipment as the year closed was 7.50c, St. Louis. Despite the inactivity in spelter, sheet zinc continued in good demand all through the year at 19c, f. o. b. Illinois mill.

Tin Market Features

The tin market has been interesting, especially in the latter part of 1917. All supplies of Straits tin are exported from British possessions and are under the control of the London

Average Monthly Nonferrous Metal Prices in 1917

Prompt Wholesale Lots, Cents per Pound, New York Unless Otherwise Stipulated

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Copper, electrolytic	30.443	35.381	36.164	32.434	32.625	32.893	30.18	28.38	27.16	23.50	23.50	23.50
Copper, lake	29.738	34.833	35.562	32.738	32.159	32.05	62.39	62.739	61.674	61.814	74.443	23.50
Tin	44.158	51.458	54.59	55.972	63.50	62.111	10.90	10.641	9.026	6.93	6.162	88.25
*Lead	7.568	8.333	8.977	9.00	9.659	10.25	8.76	8.335	8.128	8.00	7.804	6.25
Spelter, St. Louis	9.8407	10.350	10.612	9.591	9.327	9.312	57.00	51.152	44.049	39.75	36.75	7.682
Aluminum	59.798	57.083	60.681	61.238	62.909	61.25	16.39	15.432	14.782	14.925	14.012	36.75
Antimony	16.528	29.791	31.715	35.452	25.579	19.862	29.47	27.391	27.232	23.50	23.50	14.875

*American Smelting & Refining Co.'s official asking price.

rubber and tin exports committee, which originally was created to prevent supplies from falling into enemy hands. When the United States went to war, American firms bought heavily in the London market and prices began to rise there and in the far east. But the London committee was very slow to grant permits. By October supplies in this country were scarce and by November an actual famine existed. In the meantime a subcommittee on tin had been appointed by the American Iron and Steel institute, to co-operate with the department of commerce in regulating distribution of tin arriving in this country. Later this committee was authorized by the government to take complete charge of this distribution. The market for Straits opened at 43c last January, advancing to about 63c by May and remaining at around that level until November, when it advanced to about 80c. In December no tin analyzing 99¾ per cent and higher could be obtained, although consumers were bidding above 90c, and inferior grades were just about as scarce and proportionately high. Some large consumers, through the tin subcommittee, were allotting part of their reserve stocks to small consumers working on government orders, at the price which these consumers had to pay in replacing their supplies by buying futures. Thus Banca tin was sold at 72c, when the same grade was being quoted 90c nominally in the open market. No Straits prices were quoted as the year closed.

Lead Booms, Then Declines

The lead market experienced a boom lasting over about seven months of the year, beginning last February. As the year opened the quotation in the outside market was 7.50c, New York, the American Smelting & Refining Co. quoting the same figure. By August the ouside market reached 12c, while the leading producer was quoting 11c, New York.

Producers did not know what the government's requirements would be and they laid aside large stocks. In July, August and September the government paid a fixed price of 8c, St. Louis. By October, however, the general market commenced to decline, so producers entered into an agreement with the war industries board to charge the government the average price for the succeeding month as quoted in the *Engineering and Mining Journal*, with a maximum of 8c in case the general market advanced to that level. This method was followed the rest of the year. The decline from the August high point was very sudden and was led by the principal producer, which dropped its price $100 a ton to 6c in less than two months, later advancing it to 6.25c, where it remained pegged during most of November and December. As the year closed the outside market was quoting 6.25c to 6.37½c, St. Louis, the leading producer 6.17½c, St. Louis.

The outside aluminum market saw a precipitous decline during the year, owing to the export embargo imposed by our government. Although the American producers' contract price for virgin aluminum was 37c for 1917-1918, the outside market opened the year at about 60c, New York. This level was maintained until July, when the market began to drop and it closed the year on a level with the Aluminum Co. of America's quotation of 37c. That producer is supplying the requirements of the government at 27.50c.

The antimony market experienced a turbulent year. At the opening Chinese and Japanese brands were quoted about 16.50c, duty paid, but with the break with Germany speculation was active. Prices rose to above 36c in April. Then, the trade was disappointed in its expectations of extensive government buying. Meanwhile, as shell contracts lapsed in Canada, this source of demand stopped. The market gradually quieted down and prices closed the year at 15c, duty paid, a decrease of over 100 per cent from the April price.

Obituaries

JOSEPH HOBSON, who died at his home in Hamilton, Ont., Dec. 19, aged 84, was an eminent engineer. He began his professional career with the constructing firm of Gzowski & Macpherson. In 1870 he succeeded Sir John Kennedy as chief engineer of the Great Western railway, later was appointed chief engineer of the Grand Trunk lines west of Toronto, and from 1896 to 1907 he was chief engineer of the Grand Trunk system. In 1907 he became consulting engineer. Among his notable engineering achievements were the construction of the international bridge between Buffalo and Fort Erie, the building of the tunnel under the St. Clair river near Sarnia, and the reconstruction of the Victoria bridge at Montreal over the St. Lawrence river. Robert Hobson, Hamilton, Ont., president of the Steel Co. of Canada, and J. Irvine Hobson, treasurer of the Canada Steamship Co., Montreal, are his two sons.

Leon J. Cohen, president of L. J. Cohen & Co., and Cohen-Schwartz Rail & Steel Co., St. Louis, died recently.

F. W. Kips, who for 10 years was auditor for the Interstate Iron & Steel Co., Chicago, died recently at his home in Pullman, Ill.

Henry Jacob Gearhart, purchasing agent or the Pressed Steel Car Co., died at his home in Pittsburgh, Dec. 28, aged 49, after being with that company since his graduation from the Philadelphia Medical school about 20 years ago.

George T. Robinson, who until 1897 was president of the Robinson-Rea Mfg. Co., one of the first steel foundries in the Pittsburgh district, died recently at his home in Pittsburgh at the age of 80. He was a member of the ninth Pennsylvania reserves during the Civil war.

J. Howard Murray, former owner of the old Trenton Vice & Tool works, Trenton, N. J., died at his home in that city recently, after a lingering illness. He was formerly associated with his son, General C. Edward Murray, in the Crescent Insulated Wire & Cable Co., Trenton, N. J.

Thomas Evans, formerly majority stockholder of the Lebanon Chain Works, Lebanon, Pa., and for a number of years its president, died recently at his home in that city, past 80 years of age, after failing in health rapidly for over a year. Commencing work in a rolling mill in St. Louis in 1850, he later moved to Portsmouth, O., where he learned the trade of roll turner. Later he returned to Cincinnati, the scene of his schooldays, to work at his trade, and in 1859 built the first rolling mill to be erected in Alabama, in Shelby, Ala. After a journey to the north subsequent to the John Brown raid he returned to the south as superintendent of the Ettawa Iron Works, Ettwa, Ga., where he remained until the war of 1861 sent him north again. In August of 1861 he produced rolls and machinery for the government at the plant of the Swift Iron & Steel Works, Newport, Ky., and during that winter was placed in charge of the entire plant. His rise from that time on was rapid. It was largely through his efforts that the Lebanon Chain Works achieved success.

Reward Faithful Service

Industrial Plants Distribute Bonuses and Other Substantial Forms of Appreciation of Employes' Loyalty—Insurance Grows in Favor

MANY employers took advantage of the opportunity offered at the year end to distribute rewards for faithful service and regular attendance. As usual in a large number of cases, these took the form of bonuses, but that the group life insurance idea rapidly is spreading in the industrial world is evidenced by the many announcements made of the presentation of policies to employes as Christmas presents. Some, however, gave both and these include the Crane Co., Bridgeport, Conn., and the Driver-Harris Co., Harrison, N. J. The former company gave each of its 3000 employes 10 per cent of his yearly earnings in addition to the regular monthly bonus of 10 per cent. This annual bonus aggregated $246,000. To all employed for more than three months and less than six years, $500 policies were given, the $1000 policies going to those employed longer than six years.

Each of the 250 employes of the Oesterlein Machine Co., Cincinnati, received insurance policies, those employed less than a year, $500 and those over a year, $1000, while 1500 employes of the Bullard Machine Tool Co., Bridgeport, Conn., were presented with accident and health policies, calling for the payment of $10 weekly for a period of 26 weeks, for any illness or accident sustained whether incidental to employment in the shop or not. These employes are already covered by life insurance policies of $500 each and accident policies to compensate for accidents in the shops.

An added feature of the group life insurance plan followed by the Lincoln Twist Drill Co., Taunton, Mass., is the "disability clause." Each employe in service three months was presented with a $300 policy. After six months' continuous service, the policy is increased to $500, in a year to $600 and each succeeding year $100 is added until a maximum of $1500 is reached. This plan is retroactive and the insurance applies in the event of death from any cause while employed by the Lincoln company. Provision is made whereby any employe, who from any cause, prior to his 60th birthday becomes wholly disabled and unable to earn his living, shall receive the amount due him according to the length of employment, with interest, payable annually in from 5 to 20 payments.

Policies in amounts from $250 to $1000, depending upon length of service were distributed by the Ball & Roller Bearing Co., Danbury, Conn., to their employes, while the Electric Controller & Mfg. Co., Cleveland, gave policies to its 330 men and women employes in amounts from $300 to $3000, representing six months salary of the recipient. These automatically increase until in four and a half years, the face of the policy represents one year's pay. This does not interfere with any bonuses paid nor with payments for accidents under the workmen's compensation law.

Bonuses Not Taxed

Since the treasury department has ruled that industrial bonuses may be deducted from gross income in arriving at net income for tax purposes, of intense interest to large numbers of employes are the several distributions recently made. Among the announcements reported, are the following: The Washington Iron Works, Seattle, distributed a $12,000 bonus; the American Chain Co., York, Pa., distributed $40,000 to 1500 employes in amounts of $70 to $300; the L. S. Starrett Co., Athol, Mass., distributed bonuses based on length of service in amounts representing from four to 10 per cent of the wages for six months ending Dec. 31, 1917; the Wyman-Gordon Co., Worcester, Mass., and Cleveland, gave $10 to each employe who had served one year or less and increased amounts for longer periods until those who have been affiliated with the company for 25 years, received 10 per cent of their year's wages; the Goulds Mfg. Co., Seneca Falls, N. Y., will pay its piece-work employes a 10 per cent bonus quarterly, contingent upon a stipulated amount of time being put in during the previous quarter; the Crocker-Wheeler Co., Ampere, N. J., manufacturer of electrical machinery, announces that during 1918, its employes receiving less than $2500 per year, will be presented with from 10 to 12 per cent of their earnings, according to length of service; The Traut & Hine Mfg. Co., New Britain, Conn., gave its employes a bonus of 10 per cent of their wages and salaries for the last four months of 1917; the Allis-Chalmers Mfg. Co., Milwaukee, will continue to give quarterly bonuses to its 8000 employes of 10 pe rcent during 1918, which aggregate $750,000 yearly; while the 200 employes of the Aluminum Goods Mfg. Co., Manitowoc, Wis., with branch plants in Newark, N. J., and Two Rivers, Wis., received a $10,000 bonus on 1917 wages.

As a reward for never being late or absent during the entire past year, The Cincinnati Planer Co., Cincinnati, presented eleven men with 5 per cent of their individual annual earnings in addition to the 5 per cent provided in the Christmas savings fund.

Puddlers Wages Soar

Since the commencement of the industrial activity attendant upon the war, wages of boilers or puddlers have advanced 160 per cent. The recent bi-monthly wage settlement between representatives of the Western Bar Iron association and the Amalgamated Association of Iron, Steel and Tin Workers brought an advance from $13.80 to $14.30 a ton, which will prevail for two months. This is $8.80 or 160 per cent above the base rate of $5.50 which is unprecented. Bar iron finishers are advanced about 5 per cent. The settlement was based on a 2.95c bar iron price compared with 2.85c two months previously.

Housing of Labor is Main Shipbuilding Problem

A request by Admiral Bowles, head of the construction department of the Emergency Fleet corporation, for authority to commandeer houses, car lines, ferry boats, summer resorts, etc., near shipyards to furnish employes with dwellings may represent the solution of the problem confronting the shipping board as to how labor may be retained. Raymond B. Stevens, vice chairman of the shipping board, testified before the senate committee that while he opposed conscription of labor, something should be done to secure an adequate supply of workmen for the shipbuilding program. He stated that United States shipyards have lost a total of 536,992 working days, equivalent to the work of 20,000 men for a month through strikes and labor disputes since April 6, when war was declared. Mr. Bowles told the committee that the production of ships easily could be increased 50 per cent if attention were paid to the housing problem which is the chief cause of unrest. The shipping board recently asked congress to appropriate $35,000,000 for houses for shipyard employes.

In Seattle, the war shipping committee of the chamber of commerce and the Commercial club has taken up the question of housing the 20,000 men to be sent by the government for shipyard work. Citizens are being urged to build the 5000 homes that will be needed. Committees have been appointed to procure vacant offices and loft space and to co-ordinate plans for constructing dormitories. Several industrial concerns have

formed separate corporations to build and rent houses to employes. But it remains for Elizabeth, N. J., to treat the problem in a municipal way. It recently formed the Economical Homes association because of the house famine being experienced due to increased industrial activity. Two and four-family houses are to be built by the association for the use of workmen. The Keasby & Mattison Co., Ambler, Pa., is building 200 six-room dwellings. It is stated that 3000 acres in Washington Park on the Delaware river below Gloucester may be used as the site for homes for workmen of the American International Shipbuilding Corp., Hog Island, near Philadelphia.

Open Labor Bureau

Because of increasing demands for labor in the Pittsburgh district, a branch of the state employment bureau has been opened in the South school building, Diamond and Ross streets, Pittsburgh. This branch bureau will be under the supervision of S. H. Thompson, with A. T. Kiel, formerly of the Mesta Machine Co., in charge of the skilled and semiskilled labor department. A. M. Koler has charge of the common labor department and the supplying of female labor receives the attention of Superintendent Thompson. He recently received an order for 1200 women operatives for munitions plants. The bureau filled more than 1600 positions in December.

Since the miners' new wage scale went into effect recently, more than 300 men have applied for employment at the Shamokin, Pa., colleries. Many workmen formerly employed in these colleries are expected to return because of the advance.

"On the Job" is Bugle Call to Industry

THAT industry carries an important responsibility for the successful prosecution of the war by keeping persistently and constantly on the job has been emphasized effectively by Henry M. Leland, president of the Liberty Motor Co., Detroit, and by Colonel W. H. Morgan, president of the Morgan Engineering Co., Alliance, O. They have issued stirring appeals to the loyalty, patriotism and Americanism of each employe in their respective plants. Each man in the shop is called upon to do his full duty and not to fail his comrades in the trenches. Only in this way, it is pointed out, can the war be won, and speedily. Some of the striking phases of the appeals of these employers to their men are given below.

By Henry M. Leland

We are at war. We, as a nation, are in a most desperate state of unpreparedness. The war cannot be won without the essential equipment of a modern successful army. Aeroplane engines are one of those essentials.

Every day's delay means 6000 lives of our noble boys, the patriots of our country and of our allies. It also means each day the loss of hundreds of millions of wealth, represented in equipment. Hence, every hour, every minute of unnecessary delay is a crime—real treason—toward those who are fronting the dangers and who are patiently enduring hardships for you and for each us.

We urge every person in our employ not to allow themselves to be satisfied unless each and every day they have done everything they can possibly do to win this war.

Our job, to help end the war, is to make motors for aeroplanes. We have really accomplished nothing until we are turning out motors in quantities. Have you done all you can today and will you do all you can each day to remove all obstacles to overcome all difficulties to get motors, to get the best possible motors, to get the largest possible number of motors? If you are helping with all the energy, all the skill, all the push with which God has endowed you, that is good, and everybody is and should be proud of you. If you are not doing all these things, you class up with the slackers and have no right to look the flag square in the face.

Six thousand men, on an average, dying every 24 hours, puts squarely up to each one the question, "Am I doing all I can?"

The United States of America expects every man to do his duty.

All patriots will.

By W. H. Morgan

With eleven-twelfths of the world at war, individual rights must give way for the benefit of national rights. What will become of us if we don't realize our duty soon, and do it?

Don't take too long to think. Act.

Don't sleep at your machine night or day. How can manly men do this?

Don't lose time, do more than your part.

Don't get peeved. War is on.

Don't forget the poor fellow in the field who might return home some day if you will only help to get him implements of war to defend himself not only for you but for your family.

Don't forget the war has just begun. For humanity's sake, realize it and help. You are working not only for our company, but for the country.

Don't be a slacker. Help every minute.

Don't leave a tool idle. Forget self for country and home. Men in the trenches work 24 hours a day, including holidays.

Don't require a foreman. You do the pushing. Nothing can win but individual effort. Let us do our part quickly without waiting for the have to.

Don't find fault if things are wrong without suggesting a remedy. We welcome suggestions.

Don't gossip with the other fellow and prevent him from doing his part.

Don't let this appeal fall flat. It means you, every one of you, men and women.

In the end, whether we are successful or a failure by doing all we can now, we will have the satisfaction of knowing we did our part. It is up to you and every true American. Your country asks your help. Come across.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

JAMES McNAUGHTON has been elected president of the Eddystone Munitions Co., Philadelphia, and Captain Walter Wilhelm has been chosen vice president. Mr. McNaughton was recently appointed consulting vice president of the Baldwin Locomotive Works, Philadelphia, after serving as assistant to the president of the Eddystone Munitions Corp., Eddystone, Pa. Prior to his going to Eddystone, he was vice president of the American Locomotive Co., New York. Charles J. Schlacks, general manager of the Remington Arms Co., has been made chairman of the board of directors of the Eddystone Munitions Co., Philadelphia.

Thomas Nesmith Jr. has been appointed superintendent of the Market street plant of the United States Cartridge Co., Lowell, Mass.

J. Q. Finfrock has been appointed manager of the Remington Arms plant at Bridgeport, Conn., to succeed P. H. Phinney, resigned.

Alex. L. Feild and A. N. Detweiler have joined the engineering staff of the Powdered Coal Engineering & Equipment Co., Chicago.

L. W. Adams of Bethlehem, Pa., recently was appointed general superintendent of the Trenton, N. S., plant of the Nova Scotia Steel & Coal Co.

J. A. Massel is now in charge of the New York office at 826 Trinity building, 111 Broadway, of the O'Neil Iron Works, Buffalo.

Charles Spalding, who has had charge of the sales in the Detroit and Michigan districts for the Gisholt Machine Co., Madison, Wis., resigned Jan. 1.

W. A. Lownds, upon his resignation as assistant purchasing agent for the Fulton Iron Works, St. Louis, was appointed purchasing agent for the O'Neil Iron Works, Inc., Buffalo.

George Endicott formerly mechanical engineer for the Morgan Spring Co., Worcester, Mass., is now affiliated with the sales force of the Wickwire Steel Co., Buffalo.

William H. Chapman, formerly a chemist for the Norton Co., Worcester, Mass., who recently received a commission as first lieutenant in the aeronautic branch of the aviation corps of the United States army will leave soon for France.

N. M. Stineman, chief engineer of the La Salle Engineering Co., Chicago, has received a captain's commission in the United States engineering corps.

J. W. Fall, formerly of the firm of Cavert, Fall & Miller, Nashville, Tenn., retired Jan. 1, and was succeeded by M. G. Lipscomb. The concern is now known as Cavert, Miller & Lipscomb, manufacturers agents.

Robert J. Anderson, chief chemist and metallurgist of the Cleveland Metal Products Co., Cleveland, has presented his resignation effective as of Feb. 1.

G. M. Lawther, formerly with the Pittsburgh Gage & Supply Co., and the Colonial Supply Co., Pittsburgh, has accepted a position in the Pittsburgh office of the Biddle Purchasing Co.

Edmund J. Cafferty, formerly affiliated with the New Departure Mfg. Co., Bristol, Conn., in its production department, has received a commission as first lieutenant after taking a course of training at Plattsburg camp.

Charles Philip Coleman has been promoted to the presidency of the Worthington Pump & Machinery Corp., Boston and Cambridge, Mass., having served as its vice president for some time.

F. H. Bird, who has been traveling engineer for the American Steel Foundries, Chicago, has been commissioned first lieutenant in the ordnance department of the United States army.

L. Herbert Ballou has accepted an important position with the Lewis Mfg. Co., Walpole, Mass., following his resignation as production manager of the Universal Winding Co., Providence, R. I.

Louis J. Voyer, who for several years was connected with the Philadelphia office of the American Sheet & Tin Plate Co., has resigned to accept the position of assistant general manager of sales with the Liberty Steel Co., Warren, O.

A. R. Vanderford, formerly affiliated with the Cumberland Foundry & Machine Co., Nashville, Tenn., has been appointed superintendent of the foundry operated by the Youngstown Sheet & Tube Co., Youngstown, O.

Arthur Baer has been made superintendent of the new blast furnace of the Mark Mfg. Co., Indiana Harbor. He was formerly assistant superintendent of blast furnaces at the south works of the Illinois Steel Co.

A. N. Martin's resignation as industrial agent for the Baltimore & Ohio railroad will take effect Jan. 1. He will then assume the position of general sales manager for the Fulflo Pump Co., Cincinnati, manufacturer of machine tools, grinding machines, etc.

Don H. Maring, formerly assistant manager of sales of the Connors-Weyman Steel Co., Birmingham, Ala., has for his present address "somewhere in France" since he was transferred overseas as captain in the ordnance department, U. S. army.

Bertrand C. Root, engineer for the MacKinnon Steel Co., Sherbrooke, Que., has made an inspection tour through Massachusetts locating sites for a chain of five munitions plants which Canadian shell manufacturers expect to erect in this country.

A. L. Browne, recent manager of the Bancroft Razor Co., Worcester, Mass., has been made chief production manager of the Worcester Pressed Steel Co., of that city. Mr. Browne was formerly systematizer for Manning, Maxwell & Moore, Inc., New York.

William Ganschow, of the William Ganschow Co., 1101 Washington boulevard, Chicago, gear cutters, was recently tendered a banquet by members of the West Park board, of which he is treasurer, at which he was presented with a diamond studded star.

Charles Hayden, of Hayden, Stone & Co., Boston bankers, has been elected a director of the William Cramp & Sons Ship & Engine Building Co., Philadelphia, to take the place of J. Kearsley Mitchell of that city, who resigned to enter the government service.

Thomas Sadler, who has been assistant manager at the New Castle, Pa., plant of the American Sheet & Tin Plate Co. for many years has been transferred to the Shenango works, where he is assistant manager and general superintendent of the hot mills. J.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

Fankhouser has been transferred from the Gary, Ind., plant to succeed Mr. Sadler at the New Castle works.

George D. Kershaw, La Porte, Ind., has been appointed general works manager for the Standard Aeroplane Corp. of New Jersey. His headquarters will be Elizabeth, N. J. He was at one time vice president of the Advance-Rumely Co.

George A. Lautz, who has been president of the Niagara Machine Tool Works, Buffalo, for about 10 years and its general manager for 27, will retire in February. He will take a needed rest and has formulated no plans for the future.

D. Gleisen, a mechanical engineer and formerly assistant manager of the Hyatt Roller Bearing Co., Newark, N. J., in charge of bushings sales has been made manager of the industrial bearings division. He has been with the company for about six years.

Stanley P. Stewart, who has been assistant superintendent of the machinery division of the American International Shipbuilding Corp., Philadelphia, has been appointed superintendent. He was at one time mechanical engineer for the Stewart Boiler Works, Worcester, Mass.

J. C. Maben Jr., who has been associated with the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., for the past four years as vice president, has resigned. A successor to Waddill Catchings, who is to go with a banking firm in New York next month, is expected to be named soon.

O. B. Pullis who had charge of the Philadelphia office of the Blaw-Knox Co., Pittsburgh, up to the time it was closed recently, has been transferred to the company's office at San Francisco. Irving Burrows, the San Francisco representative has gone into the government's service.

Siegfried Roebling of John A. Roebling's Sons Co., Trenton, N. J., is now sergeant of Co. G. 113th infantry, located at Camp McClellan, Ala. Walter A. Morton is major in the 58th brigade at that camp, while A. Harry Reading is sergeant in Co. E 311th infantry at Camp Dix, N. J.

Raymond G. Hutchinson has been appointed superintendent of the Buffalo plant of the American Brass Co., which was formerly the Buffalo Copper & Brass Rolling Mill. Mr. Hutchinson has been division engineer of the American Brass Co., Waterbury, Conn., for some time.

Samuel N. McFedries, Milwaukee, has been commissioned a major to the ordnance engineers' corps. He has been assigned to duty in Washington for the present, but will have charge of the production of gun carriages and motor trucks in an eastern district.

Charles F. Glover, senior vice president of the American Hardware Corp., New Britain, Conn., has been elected first vice president to succeed C. F. Smith, resigned, who remains a director. Mr. Glover has been connected with the corporation and its predecessors for over 40 years.

Captain John F. Trumbull, New Haven, Conn., chief engineer of public utilities commission of Connecticut, has received a commission as major in the United States army. He has been assigned to the 25th engineer's division and is now at Camp Devens, Ayer, Mass., awaiting orders.

Thomas Alexander Forsyth, who in 51 years rose from the position of office boy to that of president and general manager of the Boston Belting Co., Boston, retired recently. He was tendered a farewell dinner by the old-time employes of the company who presented him with a large loving cup.

W. C. Swartley, sales manager, and John J. Regan, superintendent, the Tioga Steel & Iron Co., Philadelphia, resigned Jan. 1. They will go into business under the name of the Philadelphia Steel & Iron Co., with offices in the Commercial Trust building, Philadelphia, making a specialty of forgings.

C. L. Bachman, formerly manager of the Chicago office of the Combustion Engineering Corp., New York, has received a commission as first lieutenant of engineers. O. de Lorenzi, formerly affiliated with this company's force of testing engineers is now second lieutenant of engineers.

W. H. Crago, mining engineer, Duluth, Minn., formerly affiliated with the Oliver Mining Co., there, has resigned and will shortly leave for Belgian Congo, Central Africa, to have charge of exploration work for the Union Minera de Haut Katanga, the largest copper mining company in Africa.

Thomas Kaveny, president and general manager of the Herman Pneumatic Machine Co., Pittsburgh, spoke before the Philadelphia Foundrymen's association, Jan. 2, on "The Herman jar ram, roll-over pattern drawing molding machine." The subject of credit was taken up by Brown Snyder, vice president of the First National bank of Philadelphia.

C. M. Carmichael has accepted the position of assistant works manager of the Electro Metals Co., Welland, Ont., having resigned the superintendency of the steel plant of the British Forgings, Ltd., Toronto, Ont. He was formerly assistant works manager in charge of the electric furnace department of the Anniston Steel Co., Anniston, Ala.

Joseph T. Martin, who for 27 years has been connected with the Sparrows Point plant of the Bethlehem Steel Co., the last 19 of which he has served as general superintendent of construction in the marine department resigned recently. He has accepted the position of general manager of the Hog Island Ship yards at Philadelphia.

D. H. Botchford has been promoted to the position of general manager of the Columbia Steel Co., San Francisco, with his main office at Pittsburgh, Cal., to succeed C. M. Miall who recently resigned. A. M. Clark continues as manager of the company's Portland, Oreg., plant, in charge of northwestern territory.

Frederick H. Brooke, formerly a director of the E. & G. Brooke Iron Co., Birdsboro, Pa., who is a brother of Robert E. Brooke, that company's treasurer, has been appointed captain in the aviation signal service. George Brooke 3rd, another of that company's directors, is now first lieutenant of artillery and aide to General Foote.

J. C. Broadnax, formerly assistant superintendent of the steel plant of the British Forgings Co., Toronto, Ont., has been appointed superintendent of the electric furnace department at the Watertown arsenal, Watertown, Mass. Mr. Broadnax was at one time connected with the electric furnace department of the Anniston Steel Co., Anniston, Ala.

Iron and Steel Labor Draft Heavy

Industry Furnishes Largest Number and Percentage for Army With Two Exceptions —General Crowder in Annual Report Declares Shortage of Labor is Inevitable—Various Adjustments Are Suggested

WASHINGTON, Jan. 8.—More men were drawn from the iron and steel and allied manufacturing industries to produce America's new national army, both as to total and percentage, than from any other single industry or similarly grouped trades, with two exceptions, according to Provost Marshall General Crowder in his report to Secretary Baker on the first draft under the selective service law. The document brims with interesting statistical information compiled under the direction of C. F. Balch, statistician of the Chicago & Northwestern.

As classified by the report, the iron and steel and allied manufacturing industries supplied 49,553 of the 587,412 registered men. The registrants numbered 587,412 out of a population of 1,258,312 engaged in the industries. The number drawn is 3.94 per cent of the population, is slightly less than 5 per cent of the total certified for the army, but does not include the great number who volunteered into other branches of the service nor the hundreds who were given officers commissions.

Agriculture Furnishes Many

Agriculture and transportation are the two exceptions where the total number accepted for service was greater than in the iron and steel and allied industries. In agriculture the total was 205,731 out of 782,503 called. Here 2,439,246 of the 13,843,518 engaged in the industry were registered. The percentage of the number accepted of the entire male agricultural industrial population was only 1.48. In transportation the total accepted was 61,077 out of 233,453 called, 743,650 registered, and 2,831,066 employed. It is a percentage of 2.1 of the largest figure. Transportation, as grouped, includes railroads, waterways, street and electric lines, telephone and telegraph, express companies, transfer, hack, etc. As to percentage, forestry had three-tenths of one per cent more men taken than in the iron and steel group, but the total was only 7984. Here also public service, other than public service corporations, exceeded, the percentage being 4.46 but the total running up to only 23,606.

The iron and steel group as classified by General Crowder, has three divisions, one including blast furnaces, steel rolling mills, and military weapon factories; another including shipbuilding and boat building plants; and the third made up of farm implement, automobile, wagon and carriage factories; car and railroad shops, and other unclassified iron and steel industries.

Acceptance Percentage is High

In the first division, 22,068 men were taken of the 241,145 registered; 92,435 had been called for examination. The industrial population in this class was given as 373,701. The ratio of men accepted to men engaged in the trade is 5.90, the highest of any except the oil and gas well classification where one-tenth of one per cent noses out the steel industry. In the shipyard group the population was 62,071; registrants, 35,949; called, 11,910; accepted, 2628; and ratio, accepted to population, 4.23. In the third group the figures are, respectively, 822,540; 310,318; 102,860; 24,857; and 3.02.

Between the agricultural industry and the nonagricultural industries, the report makes many comparisons. Some are as follows: Of 782,503 agriculturalists called, 11.94 per cent claimed exemption. Of 2,300,446 non-agriculturalists called, only 2.06 per cent asked for discharge. The number of agricultural claims pending, 1088, is 202 more than those pending in the other industrial divisions. The agricultural appeals to the President numbered 17,218, nearly 30 per cent of the claims refused. The President has granted only 7.26 per cent, but 7021 are still pending. Non-agricultural appeals aggregate only 4719 or about 28 per cent of the claims denied. Here he has allowed 8.2 per cent with 1475 still pending.

The report indicates that the draft may have the effect of drafting labor, even suggests the possible need of conscription of labor for industrial requirements and emphasizes the necessity of regulating the wages of labor. The report says, in part, as follows:

"The draft itself is an instrument of compelling force in controlling and distributing labor supply throughout the United States. It is conceivable that our national necessities may require a direct draft of labor. Repugnant as this may seem to some of our ingrained peace-time ideas, there can be little doubt of the authority of the government to adopt such a measure. But there are measures short of this suggested in the draft regulations as they now stand, which give a powerful lever of control of labor supply that should be tried before we pass to the extreme of a direct industrial draft. Since this is so, the responsibilities of this office do not end with the prompt supply of levies for the army. The entire industrial field must be explored, provision of facile and effective methods must be perfected, and the selective service system must stand as a pervasive and supple control which shall serve its purpose so far as its powers make possible, in co-ordinating the man power of the nation and so fostering its industries in a nice and impartial balance which shall carry forward all varied endeavors, not singly or irregularly, but compacted in an even and synchronized march.

"While the selective system attempts to protect only those engaged in industries essential to the national interest it covers by the clearest terms all agriculture and all industries except those patently nonessential. It is designed to produce an immediately available class which shall protect all skilled labor appurtenant to agriculture and to all essential industry.

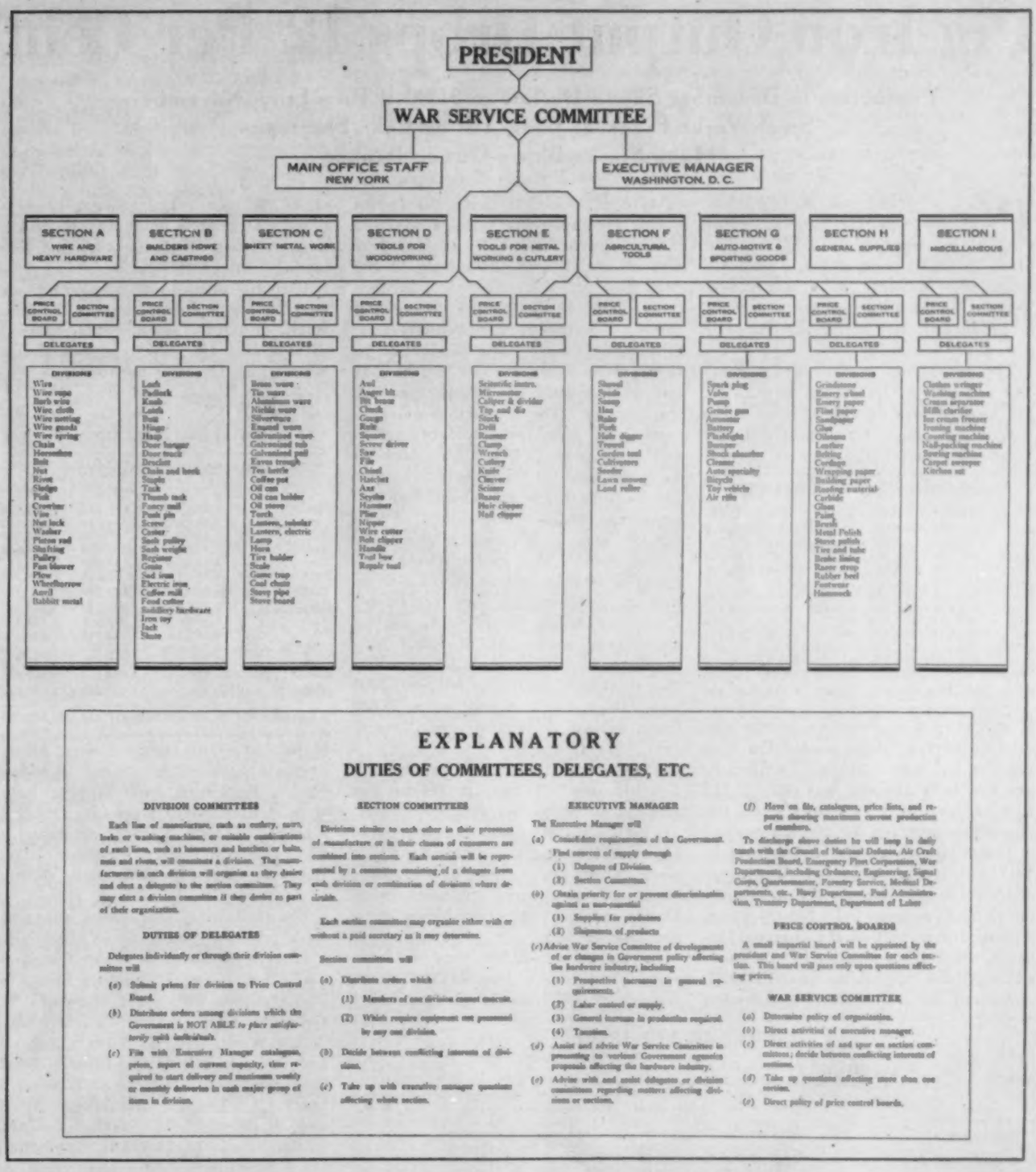
Eighty Per Cent Are Exempt

"The failure in direct deferment on account of engagement in nonessential industries may seem at first sight to depart from the resolution that the general industrial balance of the nation is not to be destroyed. The first impression fails to consider the effect of the dependency deferments and the fact already adverted to that fully 80 per cent of men in any particular industry, essential or nonessential, are removed entirely from the operation of the draft by being under or over draftable age or on account of dependency exemptions. The protection to nonessential industry, while not nearly so effective as that offered to essential industry, is sufficient to prevent destruction. This is as it should be. The added protection to essential industry will be a force to attract labor to such industry, but it will not be such a potent force as to destroy nonessential industry.

Great pressure has been exerted, first, to withdraw any exemption whatever from nonessential industry; second, to grant absolute exemption to all labor, skilled and unskilled, engaged in essential industry. The second if the milder course. The first is revolutionary. Either would be so potent as to coalesce labor supply about the favored industry.

"The second suggestion has been used

(*Concluded on page* 175)



EXPLANATORY

DUTIES OF COMMITTEES, DELEGATES, ETC.

DIVISION COMMITTEES

Each line of manufacture, such as cutlery, saws, locks or washing machines, or suitable combinations of such lines, such as hammers and hatchets or bolts, nuts and rivets, will constitute a division. The manufacturers in each division will organize as they desire and elect a delegate to the section committee. They may elect a division committee if they desire as part of their organization.

DUTIES OF DELEGATES

Delegates individually or through their division committee will

(a) Submit prices for division to Price Control Board.

(b) Distribute orders among divisions which the Government is NOT ABLE *to place satisfactorily with individuals.*

(c) File with Executive Manager catalogues, prices, report of current capacity, time required to start delivery and maximum weekly or monthly deliveries in each major group of items in division.

SECTION COMMITTEES

Divisions similar to each other in their processes of manufacture or in their classes of consumers are combined into sections. Each section will be represented by a committee consisting of a delegate from each division or combination of divisions where desirable.

Each section committee may organize either with or without a paid secretary as it may determine.

Section committees will

(a) Distribute orders which

(1) Members of one division cannot execute.

(2) Which require equipment not possessed by any one division.

(b) Decide between conflicting interests of divisions.

(c) Take up with executive manager questions affecting whole section.

EXECUTIVE MANAGER

The Executive Manager will

(a) Consolidate requirements of the Government.

Find sources of supply through

(1) Delegate of Division.

(2) Section Committee.

(b) Obtain priority for or prevent discrimination against as non-essential

(1) Supplies for producers

(2) Shipments of products

(c) Advise War Service Committee of developments of or changes in Government policy affecting the hardware industry, including

(1) Prospective increase in general requirements.

(2) Labor control or supply.

(3) General increase in production required.

(4) Taxation.

(d) Assist and advise War Service Committee in presenting to various Government agencies proposals affecting the hardware industry.

(e) Advise with and assist delegates or division committees regarding matters affecting divisions or sections.

(f) Have on file, catalogues, price lists, and reports showing maximum current production of members.

To discharge above duties he will keep in daily touch with the Council of National Defense, Air Craft Production Board, Emergency Fleet Corporation, War Departments, including Ordnance, Engineering, Signal Corps, Quartermaster, Forestry Service, Medical Departments, etc., Navy Department, Post Administration, Treasury Department, Department of Labor

PRICE CONTROL BOARDS

A small impartial board will be appointed by the president and War Service Committee for each section. This board will pass only upon questions affecting prices.

WAR SERVICE COMMITTEE

(a) Determine policy of organization.

(b) Direct activities of executive manager.

(c) Direct activities of and spur on section committees; decide between conflicting interests of sections.

(d) Take up questions affecting more than one section.

(e) Direct policy of price control boards.

Hardware Makers Organize on War Basis

A WAR convention of all hardware manufacturers has been called by the executive council of the American Hardware Manufacturers' association, to be held Thursday, Jan. 17, at the Biltmore hotel, New York. The convention has for its object, primarily, the reorganization of hardware manufacturers so that prompt assistance may be given to the government; that manufacturers may be able to secure sufficient productive capacity at suitable prices; that the question of priorities on hardware may be determined, and that those industries in hardware essential to the continuance of the war may be named. The war service committee of the association has prepared a tentative diagram showing in detail the plan of an organization best fitted to meet war exigencies.

Officers of the association are as follows: President, Charles W. Ashbury, Enterprise Mfg. Co., Philadelphia; vice presidents, Frederick H. Payne, Greenfield Tap & Die Corp., Greenfield, Mass.; A. W. Stanley, Stanley Rule & Level Co., New Britain, Conn.; Frank Baackes, American Steel & Wire Co., Chicago; secretary-treasurer, F. D. Mitchell, Woolworth building, New York.

Pig Iron Output Drops 12 Per Cent

Production in December Shows Decline of 312,000 Tons From November—Steel Works Furnaces Badly Hit by Coke Shortage—Many Stacks Blown Out or Banked

PIG iron production in December dropped to the lowest point since August, 1915. Irregular blast furnace operations, resulting from the inability to secure coke, brought about a 12 per cent decrease in production last month in comparison with November.

The production of coke and anthracite pig iron in December was 2,886,553 tons, a loss of 312,044 tons from November. A clearer insight into the extent of the sharp drop in output

AVERAGE DAILY PRODUCTION.

	1917.	1916.	1915.	1914.	1913.
Jan.	101,930	102,319	51,323	60,624	89,929
Feb.	94,641	106,157	59,521	67,450	92,095
Mar.	105,026	107,343	66,009	75,534	89,123
Apr.	110,936	107,517	70,484	75,383	91,812
May	110,119	108,535	72,747	67,646	90,865
June	108,675	107,127	78,998	63,486	87,229
July	107,659	103,907	82,687	63,075	82,525
Aug.	104,483	103,156	89,510	64,403	81,839
Sept.	104,691	106,935	94,478	62,757	83,137
Oct.	106,332	113,167	100,656	57,007	81,933
Nov.	106,620	110,593	101,174	50,042	74,322
Dec.	93,115	102,715	103,278	48,236	63,746
Av'ge	104,542	106,610	81,022	62,934	83,980

is given by a comparison of the figures on average daily production during the last two months. In December the daily average was only 93,115 tons, a loss of 13,505 tons from the November average of 106,620 tons.

The total production of pig iron in 1917, excluding charcoal iron, was 38,157,897 tons, against 39,019,123 tons, in 1916, a decrease of 861,226 tons. Adding the output of the charcoal furnaces, the 1917 production of all classes of pig iron approximates 38,525,000, compared with an actual production in 1916 of 39,434,797 tons. As shown in the accompanying table, production during the second half of last year was on a par with the output in the first half.

The bulk of the decline during December occurred in Pennsylvania, Ohio and Illinois. The production in these three states fell off 250,000 tons out of the total of 312,044 tons for the country. The production of steelworks or nonmerchant furnaces in December was 2,046,173 tons, against 2,280,640 tons in November, a loss of 234,467 tons. The merchant furnaces produced 801,344 tons, compared with 874,339 tons in November, a loss of 72,995 tons. The nonmerchant furnaces showed a loss of 10,016 tons in average daily output, their record for December being 66,005 tons, against an average production of 76,021 tons in November. The average output of the merchant furnaces fell off 3295 tons, December's record being 25,850 tons, against 29,145 tons in November.

The number of active furnaces on Dec. 31 was 321, against 344 on the last day of November and 309 on Dec. 31, 1916. Six merchant furnaces were blown out during the month, and four were blown in, a net loss of two; while 23 steelworks furnaces were blown out and only two blown in, a net loss of 21.

In December, 22,598 tons of ferro were produced, a loss of 4690 tons, compared with the November figure of 27,288 tons. The spiegel production in December amounted to 16,438 tons, or 108 tons greater than the November total of 16,330 tons.

The following merchant furnaces were blown in during the month: One Hattie Ensley (new), Sloss-Sheffield Steel & Iron Co.; one Iroquois, Miami Metals Co., Dec. 14; Susquehanna No. 1, Rogers-Brown Iron Co., Dec. 10, and Globe, Globe Iron Co., Dec. 25. The following merchant furnaces were blown out: One Hattie Ensley, Sloss-Sheffield Steel & Iron Co.; Sheridan No. 2, Berkshire Iron Works; Lebanon B, Bethlehem Steel Co., Dec. 19; Marshall, Juniata Furnace & Foundry Co.; Lebanon Valley, Lebanon Blast Furnace Co.; and Robesonia, Robesonia Iron Co., Ltd., Dec. 31.

MONTHLY PRODUCTION.

	1917.	1916.	1915.
Jan.	3,159,839	3,171,878	1,591,024
Feb.	2,649,935	3,078,548	1,666,592
Mar.	3,255,813	3,327,630	2,046,280
Apr.	3,319,809	3,225,496	2,114,518
May	3,413,677	3,364,584	2,255,157
June	3,260,234	3,213,818	2,369,932
Total 1st half	19,059,307	19,381,954	12,043,503
July	3,337,442	3,221,127	2,563,311
Aug.	3,238,970	3,197,838	2,774,825
Sep.	3,140,742	3,208,041	2,834,342
Oct.	3,296,286	3,508,180	3,120,340
Nov.	3,198,597	3,317,805	3,035,235
Dec.	2,886,553	3,184,178	3,201,605
Total 2d half	19,098,590	19,637,169	17,529,658
Grand total	38,157,897	39,019,123	29,573,161

The following steelworks furnaces were blown in: One Hubbard, Youngstown Sheet & Tube Co., and one Eliza, Jones & Laughlin Steel Co. Those blown out were: Minnequa B, Colorado Fuel & Iron Co., Dec. 20; South Works No. 6, Joliet Nos. 1 and 2, and one Gary, Illinois Steel Co.; one South Chicago, Wisconsin Steel Co., Dec. 7; Bethlehem A, B and C, Bethlehem Steel Co.; one Lackawanna, Lackawanna Steel Co., Dec. 24; Emma, American Steel & Wire Co.; one Mingo, one Columbus, two Edgar Thomson and one Neville Island, Carnegie Steel Co.; one Lorain, National Tube Co.; one Cambria, Cambria Steel Co.; one Josephine, Corrigan, McKinney & Co., Dec. 16; one Atlantic, Republic Iron & Steel Co., Dec. 19; two Coatesville, Midvale Steel & Ordnance Co.; and one Top, Wheeling Steel & Iron Co.

Furnace No. 6 at the New South works and furnace No. 10 at the Gary works of the Illinois Steel Co., Chicago, were blown out on Dec. 14, for complete relining.

DECEMBER PIG IRON

States.	No. of stacks.	No. in blast last day of month. Dec.	Nov.	Total tonnage made. Merchant.	Non-Merchant.	Totals— Dec.	Nov.
Pennsylvania	160	122	134	210,001	935,130	1,145,131	1,261,755
Ohio	79	61	63	169,705	420,141	589,846	689,430
Alabama	47	32	32	140,411	99,194	239,605	247,089
Virginia	21	15	15	40,034	.....	40,034	47,353
New York	27	21	21	74,046	104,226	178,272	188,818
New Jersey	6	5	5	18,785	.....	18,785	27,319
Illinois	24	17	20	41,695	185,710	227,405	277,297
Colorado	6	3	4				
Indiana	14	13	14	24,328	255,527	279,855	278,130
Maryland	4	1	4				
Wisconsin	6	4	4				
Kentucky	7	5	5				
West Virginia	4	3	4	47,678	22,157	69,835	75,036
Tennessee	17	10	10				
Washington	1	1	1				
Georgia	2	1	1				
Texas	3	0	0				
Minnesota	3	3	3	34,661	24,088	58,749	62,752
Michigan	3	3	3				
Missouri	1	1	1				
Spiegel—All states...						16,438	16,330
Ferro—All states....						22,598	27,288
Total	435	321	344	801,344	2,046,173	2,886,553	3,198,597

Start First Mill

Of Extensive Bar Plant of Carnegie Steel Co. at McDonald

The first unit, an 8-inch guide mill, of the new McDonald plant of the Carnegie Steel Co., at Youngstown, O., began regular operations Jan. 3. It is a miscellaneous mill and its capacity is dependent upon the material it produces. It is equipped to roll rounds and squares up to ⅜ inch, concrete bars and flats up to 1½ inches wide, No. 12 gage up to 7/16 inch thick, and also special sections. The mill has been running experimentally for some time, rolling material used in connection with the construction of the plant, where four mills now are being installed, the three in addition to the 8-inch mill being a 10-inch guide mill and two 8-inch hoop mills. It is expected to put the 10-inch mill in operation on regular turns in about two months and the two hoop mills in operation about the first of May.

The mills will be driven by electric power supplied by the gas-electric engines at the Ohio works of the Carnegie Steel Co., Youngstown, O. The current is conveyed five miles to the McDonald plant by high-tension lines supported by 80 steel towers, and is delivered at 44,000 volts. It is distributed at 6600 volts to the mill motors. The plant will be supplied with slabs, billets, etc., by the Ohio works, the material being shipped intermill over the Youngstown & Northern railroad, a subsidiary of the Steel corporation. Furnaces using powdered coal for ignition have been installed for reheating the steel previous to rolling into bars. The mills are supplied with water from the Mahoning river. An extensive screening system has been built on the bank of the river and after the water passes through the screens, it is distributed to the various departments by electric turbines which have a daily capacity of 25,000,000 gallons. An uderground concrete tunnel, 1400 feet long, 12 feet high and 16 feet wide, leads from the plant entrance to the mills and affords the employes an access to their department without crossing any railroad's tracks. The tunnel is used for conveying castings.

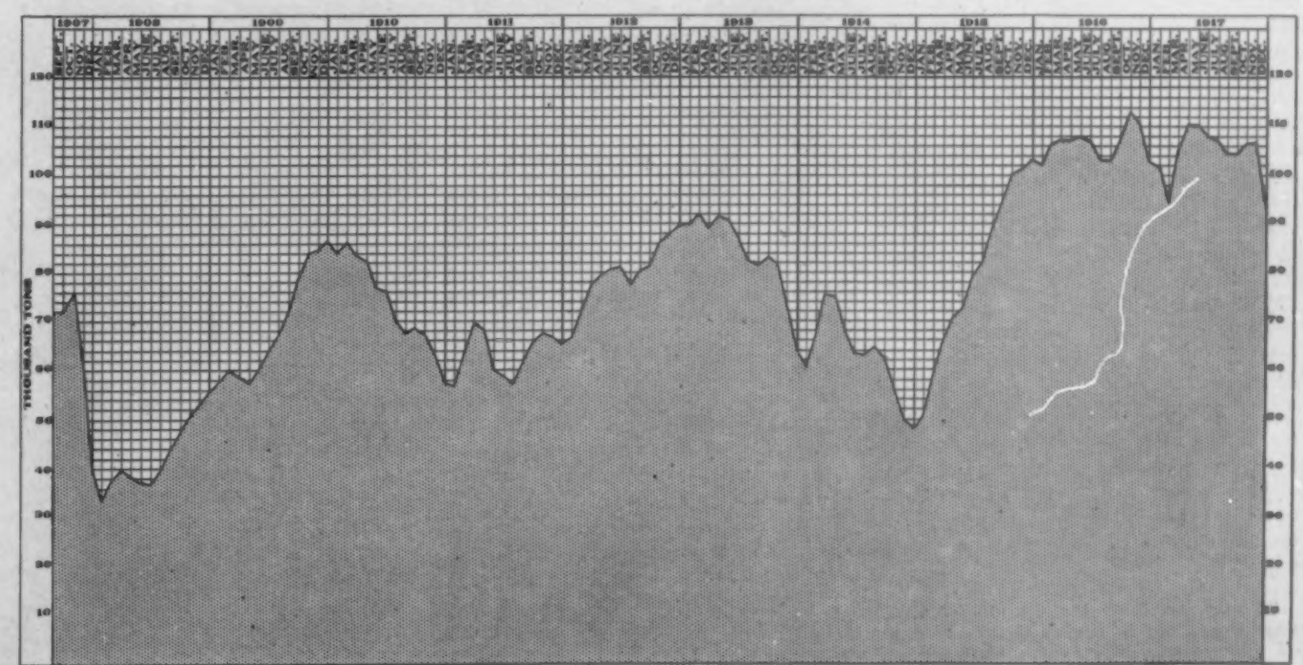
Heavy Draft on Industry

(*Concluded from page* 172)

specifically for the benefit of shipbuilding. The creation of a merchant marine is conceived by this office to be (next to the unhampered raising of our army) the most vitally necessary step in the prosecution of the war. As soon as it was made to appear that there was not sufficient labor to carry this project forward there was inserted in the new regulations a provision granting absolute immunity from draft to laborers engaged in the building and fitting of ships under the supervision of the navy or the Emergency Fleet corporation. The effect was electrical, and there is every indication that it will prove to be continuously effective. There is no longer any labor shortage in that industry.

"But the danger of such a step was instantly demonstrated. Munition factories at once demanded the same protection. The time has not yet come for this. If it were accorded to munition factories, agriculture would present a claim equally substantial, and the result would be such an inroad into class I as to abate it, to drive us into classes II and III in all other industries, and thus to break down the entire value and effect of the classification system. We can not take such a step now. When the classification is complete we shall know to the uttermost ounce just what concessions the army can make to the other paramount industries of the nation. Until that time no further concessions may be made.

"But this must be recognized: Even after all such concessions have been made the labor supply will be insufficient for the demands of even necessary industries. Man-power adjustments must be made on every hand, and they can no longer be made at the expense of the army. What are termed nonessential industries must not be destroyed; and if this nation can not continue under the relatively slight burden upon its man power, then it will stand established as the incompetent among the civilized nations of the world. Such a result is unthinkable. The problem must be faced and solved. This office will go as far as is humanly possible, but with its limited power it can not offer a complete solution. Women must take the place of men wherever that is possible. Waste of effort must be abolished. And finally, aside from manipulation of the effect of the draft, more subtle and equally powerful methods must be evolved, labor must be regulated, and the disproportionate prices now prevalent for the inducement of labor to abnormal areas must be controlled by administrative regulation which shall more effectively control the supply of labor appurtenant to every war-time industry. In no other manner can this very clearly defined and really simple problem be approached."



AVERAGE DAILY PRODUCTION OF COKE AND ANTHRACITE PIG IRON

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Proposes Entire Recasting of War Tax

COMPLETE remodeling of the income and war profits sections of the war revenue act of 1917 is proposed in a bill introduced by Senator Smoot, Utah, last week. Mr. Smoot is a Republican member of the senate finance committee and has voiced the sentiment of many business men in sharply criticizing the present act. He now proposes to recast these taxes in a way to make them understandable to the average citizen and to remove the injustices and discriminations which he declares the present act to contain. The proposed amendment to the excess profits section wipes out the mooted questions of invested capital, watered stock and bonded indebtedness and with a few modifications revises the basic theory of profits comparison on which the senate bill was founded before it went into conference last September. Mr. Smoot designates his amendment as "war profits tax" instead of "war excess profits tax" as designated in the present act.

Five Years in Pre-War Period

War profits are ascertained by deducting the pre-war profits from the net income of the trade or business for the taxable year. The bill takes as the pre-war period the years 1909, 1910, 1911, 1912 and 1913, excluding the two calendar years in which the net income of the trade or business was respectively the greatest and the least. The pre-war profits are the average annual amount of the net income of the trade or business during the pre-war period, plus 8 per cent of the new capital actually paid into the trade or business since Dec. 31, 1913, and minus 8 per cent of the amount of capital similarly withdrawn.

The bill proposes a tax to be paid for each taxable year on the incomes of every corporation, partnership or individual, engaged in trade or business, equal to the following percentages of the war profits of such trade or business:

"Ten per cent of the amount of such war profits not in excess of 10 per cent of the pre-war profits of such trade or business, (determined as hereinafter provided.)

"Twelve and one-half per cent of the amount by which such war profits exceed 10 per cent of such pre-war profits and do not exceed 20 per cent thereof.

"Fifteen per cent of the amount by which such war profits exceed 20 per cent of such pre-war profits and do not exceed 30 per cent thereof.

"Twenty per cent of the amount by which such war profits exceed 30 per cent of such pre-war profits and do not exceed 40 per cent thereof.

"Twenty-five per cent of the amount by which such war profits exceed 40 per cent of such pre-war profits and do not exceed 50 per cent thereof.

"Thirty per cent of the amount by which such war profits exceed 50 per cent of such pre-war profits and do not exceed 60 per cent thereof.

"Forty per cent of the amount by which such war profits exceed 60 per cent of such pre-war profits and do not exceed 70 per cent thereof.

"Fifty per cent of the amount by which such war profits exceed 70 per cent of such pre-war profits and do not exceed 80 per cent thereof.

"Sixty per cent of the amount by which such war profits exceed 80 per cent of such pre-war profits and do not exceed 90 per cent thereof.

"Seventy per cent of the amount by which such war profits exceed 90 per cent of such pre-war profits and do not exceed 100 per cent thereof.

"Eighty per cent of the amount by which such war profits exceed 100 per cent of such pre-war profits.

The amendment places the normal income tax at 2 per cent, as under the old law, but consolidates the surtax. The tax on corporation incomes is made 8 per cent above $2000, estimated to raise $715,000,000, or $180,000,000 more than the present act. The tax on war profits is estimated to raise $1,351,050,000 revenue annually. The bill proposes to levy a tax of 2 per cent on entire net individual incomes and an additional tax graded from 1 per cent on net incomes in excess of $5000, but not in excess of $7500, up to 63 per cent on the amount which the net income exceeds $2,000,000. So also with the tax on corporations. The bill proposes, first, a tax of 8 per cent on the net income received by the corporation and in addition a tax of 10 per cent on the amount remaining undistributed six months after the end of each calendar and fiscal year of the total net income of every corporation and stock company. Corporations having a net income of less than $2000 are exempt from the 8 per cent income tax. The amendment would do away with the 8 per cent tax on salaries and other income received for services. Senator Smoot, in a statement on the floor said: "The only excuse I have heard for not amending existing revenue acts is that the blank returns already have been prepared by the treasury department and should be delivered to persons interested within the next 30 days, as under existing laws the returns must be made by March 1. My amendment provides in section 300 that the commissioner of internal revenue, with the approval of the secretary of treasury, shall by regulation allow an extension of time, not to exceed 11 days for the filing of returns for and the payment of income and war profits taxes for the taxable year 1917. If the amendment is adopted any time during the month of January or February, it will not be too late, with a reasonable extension of time, to have the blanks prepared and sent to the interested persons. I see no reason why this amendment should not pass both houses of congress within the next 30 days.

Council Commences Trade Acceptance Campaign

Distribution of literature in its educational campaign has been started by the American Trade Acceptance council, from its recently established headquarters, room 466, Woolworth building, New York. Three great organizations are represented in the council, which was formed as a result of recommendations made at the meeting of the Investment Bankers' association last September in Atlantic City. These are the Investment Bankers' association, the United States chamber of commerce and the National association of Credit Men. Each named a committee of three and these formed the Trade Acceptance council, with Lewis E. Pierson as chairman. Several comprehensive publications already are in print and

others are being prepared, explaining the functions of the trade acceptance.

In a letter to Chairman Pierson of the council, Governor Harding of the federal reserve board states: "The board has learned with much interest and satisfaction of the formation of your joint committee with the object of promoting the use of the trade acceptance in the settlement of obligations arising out of commercial transactions. As you know, the federal reserve board and the federal reserve banks have consistently encouraged the development of the liquid trade acceptance as defined in the board's regulations, both by a campaign of education and by establishing a preferential rate in favor of this kind of paper. By enlarging the field for the sale of such paper, there will be promoted the establishment of a general discount market which is universally recognized as an important elements in the improvement of the American banking conditions."

D. C. Wills, federal reserve agent for the Cleveland district, in an address before the Association of Cleveland Credit Men at the Hotel Statler recently, stated that the large steel companies are in the forefront in the campaign to obtain a widespread use of the trade acceptance in business in place of the "frozen" book account, and added that general adoption of the new scientific medium of credit was one of the important details of winning the war.

Get Steel at 92

Employes of the United States Steel Corp. are to have the privilege of subscribing for its common stock during the current month at $92 a share. Judge E. H. Gary, chairman of the corporation, announced that 50,000 shares would be offered and these may be bought on payments. Last year's subscriptions aggregated in excess of 67,000 shares at a price of $107. In 1915 the price was $85.

Sees End to Extensions of Plants from Profits

James A. Campbell, president of the Youngstown Sheet & Tube Co., Youngstown, O., entertains an optimistic view for the next year in all essential lines of industry. He recently forecasted that business would be brisk throughout 1918, according to present indications. He said: "The demand for war materials, railroad supplies and for many general necessities will be such that only maximum operations will enable output to equal consumptive requirements. Profits, especially in the iron and steel business, undoubtedly reached their peak in 1917. Manufacturing costs have not receded, but, in fact, have been going forward to new maxima from time to time, so that with prices cut, the result is smaller gross earnings. In the iron and steel industry, it will not longer be possible to build plant extensions from earnings as in the past, and new capital from the sale of stock or other securities will be required for such projects."

Financial Crop Ends

The Toledo Pipe Threading Machine Co., Toledo, O., has decreased its capital from $750,000 to $50,000.

* * *

The foundry and iron works of the William T. Remppis Co., Reading, Pa., has been purchased from the trustees in bankruptcy by Ferdinand Thun for $33,000.

* * *

On Jan. 24, stockholders of the Grasselli Chemical Co., Cleveland, will vote on increasing its capitalization from $20,000,000 to $50,000,000. Of this amount $10,000,000 will be in preferred and $30,000,000 in common.

* * *

To comply with Ohio statutes governing foreign corporations doing business in the state, the Sharon Steel Hoop Co., Sharon, Pa., with a plant at Youngstown, O., has set aside $1,318,382 of its $10,000,000 capital for Ohio business.

* * *

Stockholders of the General Electric Co. held a meeting in New York city recently and voted to increase the capital stock to $20,000,000. If official estimates of the management are verified the fiscal year ending Dec. 31 will show a profit of $27,000,000 fully $8,000,000 in excess of the gain for 1916.

* * *

With 200,000 tons of flue dust in its stock pile at Youngstown, O., the American Sintering Co. will double its capacity there to reduce 800 tons daily. This will involve the expenditure of over $100,000. At its Hubbard, O., plant, 600 tons is the average daily capacity. The two plants will produce daily about 1000 tons of sinter of 60 per cent metallic iron.

* * *

The Atlantic Engine & Shipbuilding Co., New York and Boston, has acquired the plant of the Colonial Paper Co., Portsmouth, N. H., which has been closed for several years. It is announced that 10 steel merchant vessels for the government use will be constructed in it.

* * *

A special meeting of the stockholders of the Penn-Seaboard Steel Corp. will be held at New York, Jan. 16, to vote on the authorization of the issuance of $2,000,000 first mortgage 6 per cent 5-year serial gold bonds, dated Dec. 1, 1917. Another issuance and sale of 40,000 shares of the corporation's unissued capital stock by the board of directors will also be voted upon.

Non-War Supplies

Of Toluol Expected to be Released—Benzol Active and Weaker

New York, Jan. 5.—Present indications are that consumers of toluol for commercial purposes will be accorded permission by the government to buy at least a portion of their usual requirements. Although no official action has been taken, plans are being worked out along this line. Under the proposed arrangement, makers of essential products will receive preference. Up to the present time, however, no toluol yet has been released for anything excepting urgent government work. The navy department so far has replied to all applications for releases that the situation has not been so modified as to allow the distribution of toluol except for government purposes.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.35 to .40
Toluol (nominal)	1.70 to 1.80
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol	$0.52
Per 100 Pounds at Seaboard	
Sulhate of ammonia (nominal)	$4.90 to 5.00

Contract

Per Gallon at Producers Plant	
Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22
Per Pound at Producers Plant	
Phenol nominal.	
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

Despite further heavy sales of benzol, the large quantities of this product offered reflect clearly that production has overtaken consumption. The market is weak and now may be quoted at 35 to 40 cents per gallon, both for spot and contract depending on quantity. In some cases even lower was done on comparatively large accumulations which have been dumped on the market. Sales during the week involve many hundreds of thousands of gallons and further large transactions are pending. The government recently has placed large orders for benzol which are to be made into picric acid here. This does not mean an increase in picric acid output, however, since the contracts placed are merely extensions of expired commitments with the French government.

Solvent naphtha reflects the best tone in months. Demand both for crude and refined has improved.

Seizes Lathes For Destroyer Work

Government Commandeers 50-Foot Lathes to Push Destroyer Program to Its Utmost—Navy Department's Requirements of 60 Locomotive Cranes for 1918 Are Filled—Many Crane Inquiries Are Current

WITH the coming of the new year, the rapid unfolding of the government's vast war-preparation program is making its effect felt more perceptibly in the machine tool market. Lathe seizures for destroyer work feature this week. Indications of the earnestness with which the nation is entering into these preparations are found in the lettings of huge contracts for airplane parts, truck parts, fuses, shells, guns, gun mounts, cranes and other equipment. Machine tools, as a barometer of war orders, indicate that the east has lost some of its initial impetus and that the central west is on the ascendancy as a power in the making of munitions. The awarding of huge contracts is being felt in many branches of industry. The Morgan Engineering Co., Alliance, O., as an illustration, was awarded a contract for gun mounts and a few days later commenced work on a plant which will add approximately 500,000 square feet of floor space to its present works. A list was issued for about 275 tools, few of which have been secured up to the present time. War orders have brought out several inquiries for tools. Included are the following: From the Studebaker Corp., Detroit, for 50 machine tools; from the Cambria Steel Co., Johnstown, Pa., for miscellaneous equipment; from the E. W. Bliss Co., Brooklyn, N. Y., from the General Electric Co., Schenectady, N. Y., for about $300,000 worth of tools; from Victor R. Browning & Co., Mansfield, O., for new equipment, and from G. C. Hodgson & Co., Dayton, O., for automatic screw machines.

In the crane market, the placing of contracts for 60 locomotive cranes by the navy department was by far the most important feature of the week. Inquiries are current from the Air Nitrates Co., New York, for 14 electric traveling cranes and from the Federal Shipbuilding Co., New York, for 11 electric traveling cranes. Whittlesey & Whittlesey, New York, are active in securing equipment for the Southern Shipbuilding Co., Charleston, S. C.

ACTIVITY in the machine tool market continues lively although there are fewer long lists of tools being issued. Dealers generally secure a good volume of business even during the normally dull holiday season. In the past week the feature of the market has been the widespread commandeering of large lathes, having a 50-foot bed and longer. These lathes are wanted in connection with expediting the destroyer program; some of the delivery dates on these vessels having been advanced. Gossip in the market has it that the large submarines now being launched by the Germans have lessened the value of the submarine chasers and necessitated the presence of more destroyers. It takes comparatively little time to construct the hulls of the destroyers and it is almost as easy to obtain engines for destroyers as for chasers. But the hitch came in turning the long propeller shafts for the destroyers, this work requiring the big lathes.

Navy Department Covers for 1918 Crane Needs

THE bureau of yards and docks, navy department, Washington, has covered on 60 locomotive cranes, its estimated requirements for 1918. These cranes were apportioned among various builders, and range in capacity as follows: Forty-six, 15 to 20 tons; six, 20 to 30 tons; and eight, 5 tons. Among recent inquiries to be issued is that of the Air Nitrates Co., New York, involving 14 electric cranes. Specifications call for seven 5-ton, four 20-ton and four special transfer cranes. The Pennsylvania railroad also is understood to be in the market for two locomotive cranes. This is a revival of part of an inquiry made a few weeks ago. At present considerable attention is being directed to the requirements of Whittlesey & Whittlesey, New York, who are to purchase the equipment needed for the Southern Shipbuilding Co., Charleston, S. C. Negotiations continue on the 11 electric traveling cranes inquired for by the Federal Shipbuilding Co. This company recently placed four 10-ton cranes with the Milwaukee Electric Crane Co., four 20-ton cranes with the Erie Crane Co., and two 35-ton cranes with the Northern Engineering Works. The American International Shipbuilding Corp. has also awarded two 10-ton electric cranes to the Northern Engineering Works.

General Electric Co. Renews Inquiry

The General Electric Co. has revived its inquiry for about $300,000 worth of tools for its Lynn, Mass., plant, this list having appeared in the market several times previously. The American Can Co. has closed for about 50 lathes for its Edgewater, N. J., plant. The Davis-Bournonville Co., Jersey City, N. J., has been buying additional equipment. The E. W. Bliss Co., Brooklyn, N. Y., has been negotiating for tools for its new plant addition and probably will inquire formally in the near future. Export inquiry for machines has been active, a number of tools have been sold for export to France within the past week. The government has sent letters to machine tool dealers asking for a detailed report of all tools they are holding for export.

Boring Mills in Great Demand

TWO features characterize the Chicago market for machine tools. One is the equipment demand by plants turning out shells, and the other is the demand for boring mills from companies holding contracts for steel truck wheels. Both these features result from government contracts which are being placed in this territory to a much larger degree than formerly. One buyer, who is adding to his equipment in order to be able to handle a large contract for shells, recently bought

Achievement

IT TAKES CONFIDENCE of the staunchest type to launch a new business such as we launched a little more than two years ago, involving as it did the expenditure of hundreds of thousands of dollars in plant and equipment.

But we had confidence in the ideal which we had created and that confidence is reflected in our achievement—in every glowing furnace—in every ton of AGATHON steel they daily produce and best of all in the enthusiastic satisfaction of our customers.

AGATHON Steels will serve your purpose best.

The CENTRAL STEEL Co.
MASSILLON, OHIO

BRANCH OFFICES:

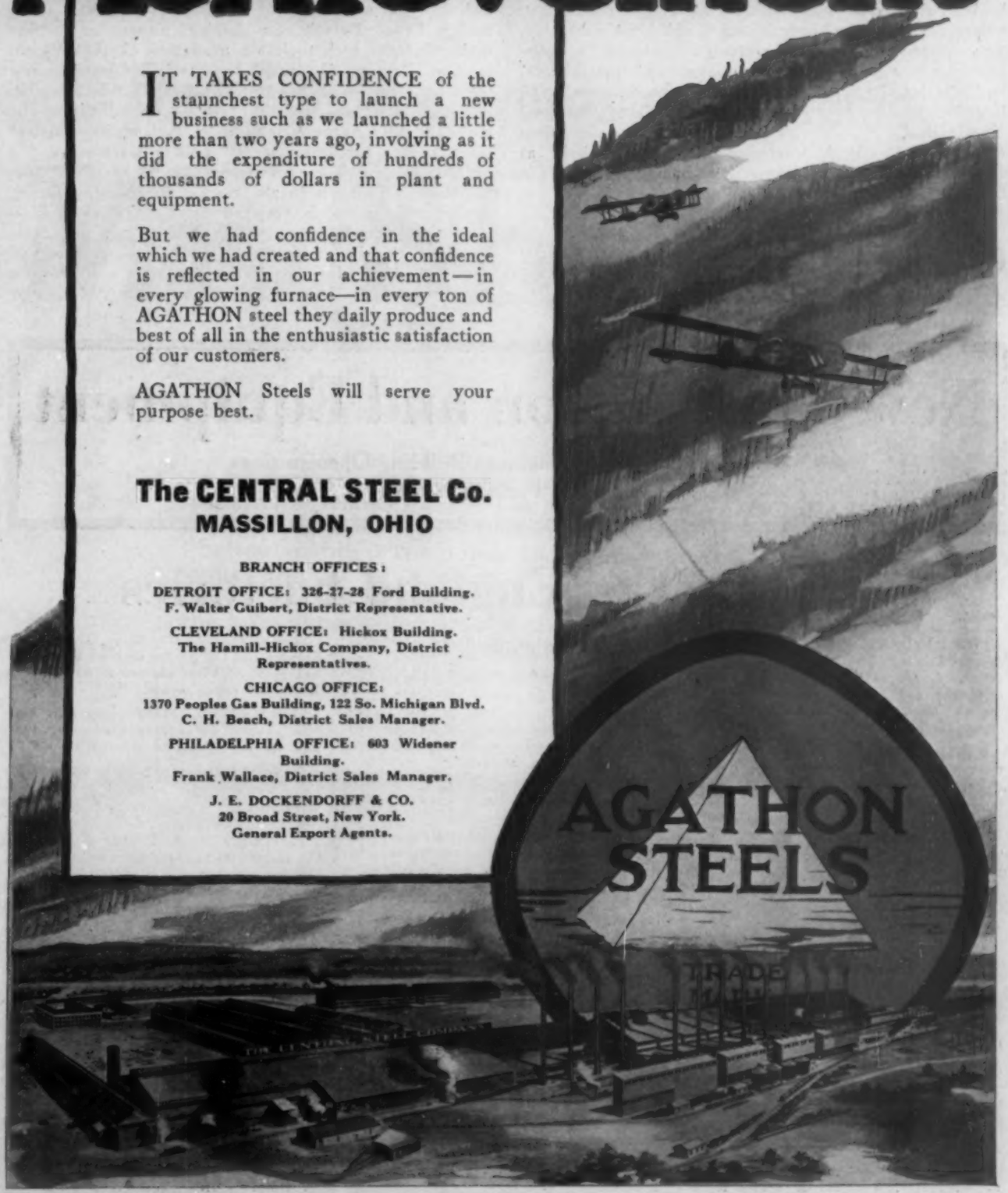
DETROIT OFFICE: 326-27-28 Ford Building.
F. Walter Guibert, District Representative.

CLEVELAND OFFICE: Hickox Building.
The Hamill-Hickox Company, District Representatives.

CHICAGO OFFICE:
1370 Peoples Gas Building, 122 So. Michigan Blvd.
C. H. Beach, District Sales Manager.

PHILADELPHIA OFFICE: 603 Widener Building.
Frank Wallace, District Sales Manager.

J. E. DOCKENDORFF & CO.
20 Broad Street, New York.
General Export Agents.



one hundred 24-inch lathes and is combing the market for 50 more. This is an example of only one of the many inquiries seeking to obtain additional lathes. One dealer has inquiries now for more than 50 boring mills ranging in size from 36 to 42 inches, all of which are to be used in finishing cast steel truck wheels. At present builders of this class of equipment can give February delivery, but this delivery promises to be deferred shortly. The arsenal at Rock Island recently placed an order for about 30 lathes. This, it is thought, will complete the purchasing of equipment required for work now under way there. Additional shops are to be built shortly for manufacturing gun recoil mechanism, however, and these will require much additional machinery. The ordnance companies recently organized in Wisconsin are not now in the market and the general buyer is inactive. Occasionally tools are commandeered by the government for special use. The Universal Engineering Co., Chicago, will build a machine shop at Maywood, Ill. A tractor plant is to be built at Peoria, Ill., by a company now being organized in Chicago.

New Year Releases Numerous Inquiries

CLEVELAND machine tool dealers report that an unusually large volume of business has been released since the beginning of the new year. Government needs, as during the latter part of last year, continue to claim the lion's share of attention. Dealers report that inquiries from the government in many cases are being sent direct to builders instead of through the usual channels. One builder is said to have been asked by federal officials for best delivery dates on 75 boring mills. The Cambria Steel Co., Johnstown, Pa., has been unsuccessful up to the present time in filling its equipment needs. The Studebaker Corp., Detroit, lately inquired for approximately 50 machine tools, of which about 40 are planers. A contract for 200 mounts for 5-inch guns has been awarded to Victor R. Browning & Co., Mansfield, O., and that company has sent out inquiries for new tools. Dodge Bros., Detroit, are buying planers and other tools wherever such tools are available. G. C. Hodgson & Co., Dayton, O., require several automatic screw machines. Engine lathes, of 16, 18 and 20-inch swing, are desired by the Pollak Steel Co., Cincinnati. The Cleveland City Forge & Iron Co., Cleveland, has inquired for a 42-inch gap lathe, several milling machines and a 24-inch shaper. The American Cast Iron Pipe Co., Birmingham, Ala., is in the market for a large planer. A hydraulic press is required by the Timken-Detroit Axle Co., Detroit. Best delivery dates and prices are asked by the Bailey-Burrus Mfg. Co., Atlanta, Ga., on one bull dozer for installation in its new forging department.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

PORTLAND, ME.—The General Shoe Machinery Co. has been incorporated to make machinery, appliances, etc., and to operate a foundry and machine shop with $200,000 capital. George T. Spear, Elmer Perry and others are interested.

PORTLAND, ME.—The Portland Development Co. has been incorporated to do a mining, quarrying, mechanical and manufacturing business with $2,000,000 capital. Lee D. Hodgkins, Frank B. Fish and Carroll S. Chaplin are the incorporators.

PORTLAND, ME. — The East Deering Foundry Co. has been incorporated with $10,000 capital. George R. Thomas, Charles E. Noyes, Joseph G. Noyes and Albert F. Thomas are interested.

PORTLAND, ME. — The International Truck Co. of Maine, has been incorporated with a capital of $10,000. The incorporators are Philip S. Brooks, Halbert P. Gardner and Irving E. Vernon. The company will deal in machinery and motor trucks.

BOSTON.—Plans are being drawn by Paul Strauss, engineer, 136 Ashmont street, Worcester, Mass., for a 2-story, 22 x 372-foot addition to the factory of C. L. Berger & Sons, 37 Williams street, Roxbury, Boston.

BOSTON.—The American Shipbuilding & Transportation Co. has been incorporated with $150,000 capital by Ralph T. Jackson, Newton, Mass.; Milton H. Reynolds, Revere, Mass., and Frederick W. Doring, Cambridge, Mass.

BOSTON.—Bids close Jan. 17 for the construction of a steel caisson 138 feet long, 53 feet deep and 27 feet wide to close the entrance to the masonry dry dock under construction by the state on the Commonwealth's flats, South Boston, Mass.

BOSTON.—The plant of W. W. Bevan & Co., Sears street, damaged by fire with a loss of $125,000.

HOLYOKE, MASS.—The MacKinnon Steel Co., Sherbrooke, Quebec, Can., contemplates erecting a plant here for the manufacture of shell forgings, for which the company has undertaken a large government contract. Bertwell C. Roote, Sherbrooke, is in charge.

SALEM, MASS. — The Wayland Tanning Machinery Co. will build a brick, 1-story, 40 x 150-foot factory building at Boston and Proctor streets.

SALEM, MASS. — The Wayland Tanning Machinery Co., Wayland, Mass., has had plans prepared for a 1-story brick factory building, 40 x 150 feet, to be erected on a site it has recently purchased at the corner of Boston and Proctor streets.

SPRINGFIELD, MASS.—The E. S. Stacy Machine Co. has been incorporated with $60,000 capital by Harry W. Stacy, Frank E. Stacy and M. R. Stacy, Frank E. Stacy is treasurer.

SPRINGFIELD, MASS. — The Fleming Foundry Co. has let the contract for a brick, 2-story, 51 x 56-foot addition to its iron foundry at 164 Birnie avenue.

SPRINGFIELD, MASS. — Contracts have been awarded for a $50,000 addition to the plant of the Springfield Aircraft Co. F. T.

WINCHESTER, MASS.—The Whitney Machine Co. has been incorporated with $100,000 capital by A. E. Whitney, R. F. Whitney and W. C. Goddard.

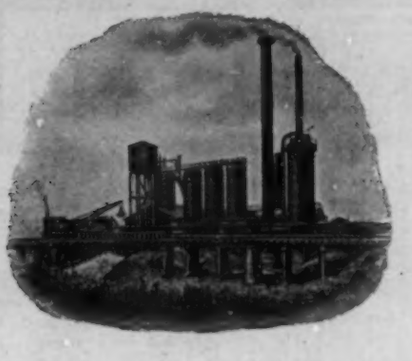
PROVIDENCE, R. I.—The Gorham Mfg. Co. has let the contract for a brick, mill construction, 1-story, 62 x 149-foot addition to its plant on Eddy street.

BRISTOL, CONN.—The Bristol Brass Co. has broken ground for a reclaiming plant on Broad street. This step follows government regulation of the supply of metal the company receives.

GILDERSLEEVE, CONN.—The Jarvis Co. will build a 40 x 130-foot factory to replace that recently damaged by fire.

HARTFORD, CONN.—Peter A. Frasse & Co., Inc., have awarded contract for a 1-story plant addition to be erected at 47 Boulevard street.

STAMFORD, CONN. — The John Davenport Foundry Co. is having plans drawn for a $90,000 shop, which will be two stories high and 90 x 300 feet. M. C. Rosenbaum, 74 Broadway, New York, is president.



DELAWARE RIVER STEEL COMPANY

MANUFACTURERS OF PIG IRON

CHESTER, PENNSYLVANIA

One hundred words introducing

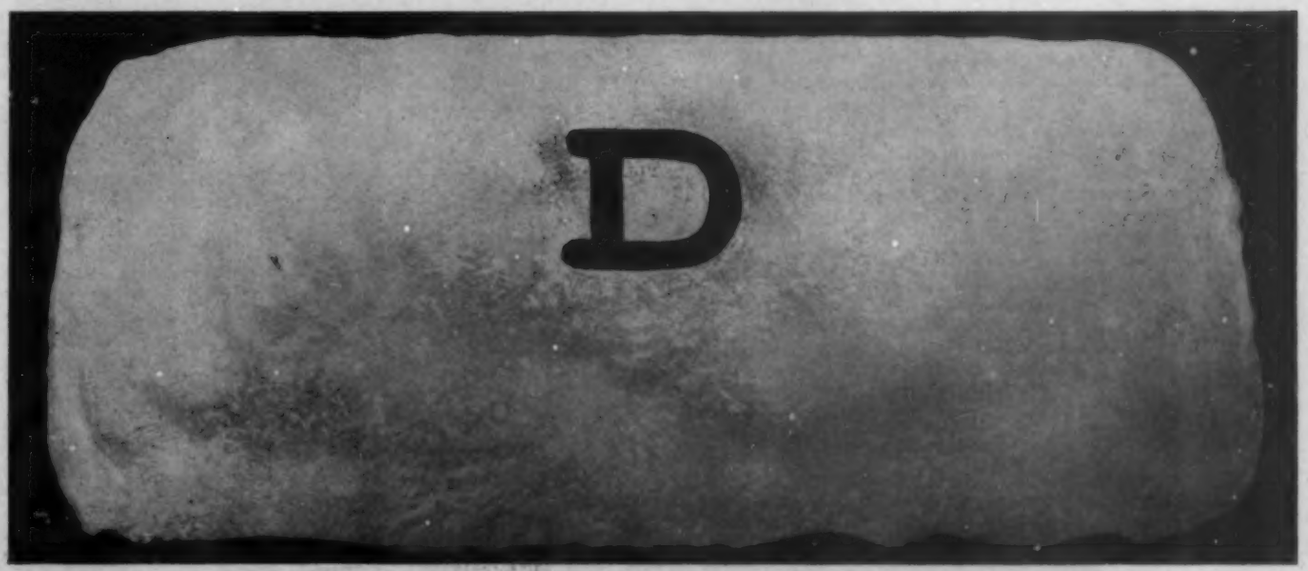
Mr. Sheldon

OF AREA, ILLINOIS

To Pig Iron Consumers:

He is a salesman, a super salesman in fact. He no longer sells but teaches the Art, in his school for salesmen. His course is "The Science of Business Building". It is well to know his methods. We do. He says: "Salesmanship is the power to persuade people to purchase product at a profit". And as to service: "The power to serve, to the end of satisfaction and profit to the buyer and seller; this is the ultimate end of business". You always get service and satisfaction in "Delaware Iron". We tell it in one hundred words. Count them.

DELAWARE RIVER STEEL COMPANY



Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—The Pioneer Iron Works, 39 Union street, is preparing plans for a machine shop. The structure will be one and two stories high, 40 x 80 feet in size. An expenditure of $12,000 is contemplated.

BROOKLYN, N. Y.—L. Motchan, Inc., has been chartered to manufacture brass goods with $10,000 capital. The incorporators are A. Motchan, H. Goldstein and R. Rudich, 259 Vernon avenue.

BUFFALO.—The Linde Air Products Co., Forty-second Street building, New York, will build a 1-story 100 x 100-foot plant to cost $25,000 and has appointed T. W. Goodrich, Forty-second Street building, New York, engineer in charge of construction.

IRONDEQUOIT, N. Y.—The department of public works contemplates the erection of a 1-story, 40 x 80-foot power house. R. H. Pierce, city hall, Rochester, N. Y., is commissioner in charge.

NEW YORK.—The Fabricated Steel Products Corp. has been incorporated with $150,000 capital. The incorporators include H. Lindemann, W. E. I. Lambrecht and W. Arnold, 322 Tenth avenue.

NEW YORK.—The Puritan Steel Co., Inc., has been chartered and will engage in the manufacture of iron and steel products. The company is capitalized at $50,000 and its incorporators include A. T. Teichberg, H. Brasch and W. J. Miller, 60 Wall street.

WATERTOWN, N. Y.—The water board has had plans prepared by the S. M. Greene Co., 293 Bridge street, Springfield, Mass., for a power plant to cost $300,000.

BRADFORD, PA.—The pattern shop of E. R. Caldwell & Co., Hilton street, has been damaged by fire with a loss estimated at $100,000. The company has been engaged in making war materials.

FOLSOM, PA.—The Light Railway Equipment Co., Chester, Pa., has purchased a 3-acre site on which it proposes to erect a new plant.

OIL CITY, PA.—The Independent Tack Co., Fostoria, O., contemplates removing its plant to this city.

AN office has been opened at 39-41 Cortlandt street, New York, by the Nagle Corliss Engine works. Frank W. Richardson has been placed in charge. Recently the company opened an office in the Bourse building, Philadelphia.

Redfield & Fisher Inc., advertising, announce that hereafter all their business will be handled at 105 West Fortieth street, New York.

A brokerage business for dealing in metals has been organized by John P. Bech and Troels Fode, under the name of Bech & Fode. An office has been opened in the Woodworth building, New York.

The American International Shipbuilding Corp. has opened an office in the Union Arcade building, Pittsburgh. John A. Fouse is in charge.

The P. F. Schofield's Co., Macon, Ga., now represents the Asbestos Protected Metal Co. in Georgia.

Announcement has been made by the Hammond-Byrd Iron Co., Chicago, of the removal of its office from 1216 to 1328 Peoples Gas building.

Hamilton & Hansell, builders of Rennerfelt electric furnaces, have removed to larger offices in the Park Row building, New York.

The Roe-Stephens Mfg. Co., Detroit, will change its name to the Scott Valve Mfg. Co. of Michigan.

The Goldschmidt Thermit Co., New York, has opened an office and storeroom at 1427-1429 Western avenue Pittsburgh. H. D. Kelley is in charge.

Formal announcement has been made by the Biggs-Waterson Co., Cleveland, of the removal of its offices from 721 Guardian building to 1235-1237 West Ninth street.

The Dry Milling Engineering Co., 202 Boston building, Denver, has been appointed western agent for the Raymond Bros. Impact Pulverizer Co., Chicago.

The Neidow & Payson Co., Chicago, has been appointed sales agent for the American Pneumatic Chuck Co., also of Chicago, which was organized a short time ago.

BUFFALO.—The Barcalo Mfg. Co. is having plans drawn by Kidd & Hopkins, Franklin street, for a 1-story 40 x 100-foot factory addition to cost $6000, to its plant at 225 Louisiana avenue.

BUFFALO.—A permit has been granted to the Sizer Forge Co., 244 Larkin street, to build a steel and concrete machine shop to cost $55,000.

BUFFALO.—A charter of incorporation has been granted to Deck Bros., who will operate a foundry and machine shop with $35,000 capital. The incorporators are B. L. Lempenau, A. G. Bartholomew and A. S. Perrers.

BUFFALO.—Fire has caused $5000 damage to the corrugated iron department of the Pierce-Arrow Motor Co., 1695 Elmwood avenue. Considerable machinery will have to be replaced.

BUFFALO.—The A. R. Williams Machinery & Supply Corp. has been incorporated with $60,000 capital. The incorporators include T. A. Hollindrake, W. H. Young and T. D. Reid.

CITY ISLAND, N. Y.—The Kyle & Purdy Shipbuilding Co. will build a 3-story, 60 x 180-foot building on Fordham street. Robert Kaplan, Fordham street, is architect and engineer.

NEW YORK. — H. Sinclair Roberts, Inc., has been organized to manufacture hardware specialties and ornamental ironwork. The company is capitalized at $10,000 and its incorporators include H. S. Roberts, G. H. Burlis and C. Carow, 1192 Union street, Brooklyn, N. Y.

NEW YORK.—The Louis Weber Building Co., 171 Madison avenue, has received the general contract for the erection of a $15,000 transformer station and warehouse for the New York Edison Co.

NEW YORK.—The Electric Welding Co. of America has been chartered with $1,000,000 capital. W. Schenstrom, J. Kjekstad and E. Schwartz, 415 Knickerbocker avenue, Brooklyn, N. Y., are the incorporators.

ROCHESTER, N. Y.—The Eastman Kodak Co. contemplates the erection of a 5-story, 150 x 400-foot factory building to cost $500,000. George Eastman, 343 State street, is president and purchasing agent of the company.

SYRACUSE, N. Y.—The Church & Dwight Co., 27 Cedar street, New York, has awarded the contract to Dawson Bros. for the construction of a $100,000 warehouse in this city. The building will be two stories high and 93 x 240 feet.

PHILADELPHIA.—S. A. Ashman & Son Co., East Tioga street, manufacturer of iron and steel forgings, will build an addition to its plant.

PHILADELPHIA. — The Acme Gear Co. has been incorporated with a nominal capital of $5000 and will manufacture gears, pinions, etc. Harry C. Cole is interested.

PHILADELPHIA.—Plans are being drawn by Stearns, Woodnut & Schmehl, engineers, 21 South Fifteenth street, for a 3-story, 50 x 225-foot factory to be built by a firm whose name is withheld. The cost of the structure is estimated at $30,000.

PHILADELPHIA.—The Millbourne Mills is having plans drawn by F. B. Davis for a boiler house, 33 x 40 feet, to be erected at Sixty-third and Market streets.

PITCAIRN, PA.—The repair and machine shops of the Pennsylvania railroad have been damaged by fire with a loss estimated at $35,000.

PITTSBURGH.—The Benner Tool Co. has been incorporated with $5000 capital by R. T. Russell.

SCRANTON, PA. — The National Carbon Co. plans to rebuild its plant recently damaged by fire.

YORK, PA.—The York Mfg. Co. plans

OHIO STEELS

If your work is such that you must have steel castings

TRUE TO PATTERN

and

ABSOLUTELY CLEAN

and you would be interested in procuring castings with which you would have a

MINIMUM MACHINE SHOP LOSS,

give us a trial.

Our Springfield Plant is the best equipped and most modern in the country for the production of steel castings up to 250 pounds.

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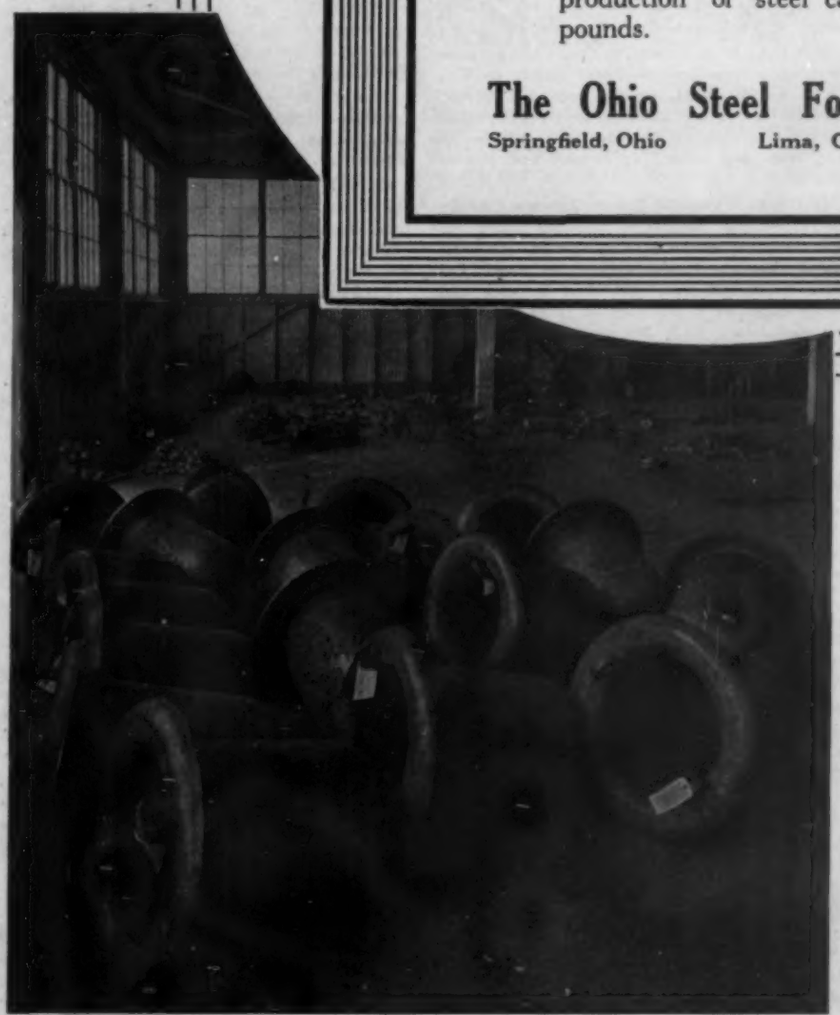
Springfield, Ohio Lima, Ohio Bucyrus, Ohio



Service PLUS Quality

Say you saw it in THE IRON TRADE REVIEW

the construction of a 1-story, 50 x 60-foot addition to its foundry.

YORK, PA. — The Standard Refractories Co., manufacturer of fire brick, has purchased three tracts of land on which it proposes to erect a large plant.

BLOOMSBURY, N. J.—E. H. Wenzelberger, Easton, Pa., is drawing plans for a 2-story, 74 x 85-foot addition to the paper mill of the Warren Mfg. Co.

CAMDEN, N. J.—The contract for a $10,000 galvanizing plant, 1-story high and 50 x 130 feet in size, has been awarded to the J. S. Rodgers Co., Moorestown, N. J., by the New York Shipbuilding Corp.

DUNELLEN, N. J.—The Crescent Color & Chemical Works contemplates the erection of a $10,000 addition to its factory, to be two stories high and 70 x 80 feet in size.

IRVINGTON, N. J. — The Reliable Tool Co. has been incorporated with $125,000 capital. The incorporators are C. Katzan, V. Katzan and L. Pischkittell, Newark, N. J.

JERSEY CITY, N. J.—The G. W. Bradley Axe & Tool Mfg. Co. has been granted a charter with a capital of $10,000. The incorporators are C. W. Bradley, Westport, Conn.; H. A. Daniel, Newburgh, N. Y., and others.

JERSEY CITY, N. J.—The General Welding Co. has been chartered with $10,000 capital to manufacture construction equipment. C. I. Rees, Lindhurst, N. J., and William B. Walsh are incorporators.

LINDEN, N. J.—The Trans-Atlantic Chemical Corp., 80 Wall street, New York, has awarded the contract for two new factory buildings.

MAHWAH, N. J.—The American Brake Shoe & Foundry Co. will build a 1 and 2-story plant addition, for which contract has been awarded to the W. L. Platt Construction Co., United Bank building, Paterson, N. J.

NEWARK, N. J.—The Bronze Art Fixture Co. has been chartered with $25,000 capital to manufacture gas fixtures. The incorporators include William D. Donovan, Russell Fleming and Matthew Bird.

RAHWAY, N. J.—The Atlas Welding Co., 146 Irving street, has been incorporated with a capital of $50,000 to manufacture acetylene welding and cutting apparatus. Among the incorporators are Walter W. Todenwarth, John Grouss and Clarence E. Pryor, Elizabeth, N. J.

Activities in the Central States

AMERY, WIS.—The Minnesota Masterlock Co. has been incorporated with $10,000 capital by F. E. Yates, I. G. Ogden, and W. T. Kennedy.

ANTIGO, WIS.—R. P. and J. T. Brown have incorporated the Electric Farm & Lighting Co. with a capital stock of $25,000. The company specializes in light and power plants for farms and other places isolated from ordinary sources of current.

APPLETON, WIS. — The Racine Motor Truck Co. is having plans prepared for a 1-story brick and steel factory building, 75 x 300 feet, to cost about $30,000. The structure will have wood block floors and will be equipped for assembling motor trucks and machining parts. A. Arthur Guilbert, Racine, Wis., is architect and engineer. Ira L. Miller, Sherman house, Appleton, is president and general manager of the company.

CHIPPEWA FALLS, WIS. — The Multi Color Printing & Machine Co., Rex building, will build a plant.

EAU CLAIRE, WIS.—Girnan & Sons Co. is having plans prepared for a 2-story machine shop, L-shaped, 45 x 150 and 45 x 75 feet, to cost about $25,000. Bids will be taken some time in January.

EAU CLAIRE, WIS. — Plans are being made by the Northwestern Motor Co. for the erection of a complete new manufacturing plant for the production of gasoline-powered railroad equipment. Kim Rosholt is president of the company. Contracts probably will not be awarded until next spring, but plans will be prepared at once.

EAU CLAIRE, WIS.—The United States Gear Shift Co., organized with a capital of $1,500,000 to manufacture a hydraulic gear-shifting device, has awarded the general contract for the erection of a 4-story manufacturing plant, 65 x 85 feet, to R. D. Rickman. The plant will contain a brass and aluminum foundry, machine shop, assembling shop, warehouse and office, and will cost about $50,000. L. A. Larson is vice president and chief engineer of the company.

MADISON, WIS.—A building permit has been issued to the Southern Wisconsin Foundry Co. to erect a new foundry and machine shop to replace the plant which was damaged by fire several weeks ago. The building will cost about $20,000 and will be erected by J. H. Findorff, Madison.

MILWAUKEE.—The Simplex Machinery & Tool Co. has been organized with $75,000 capital. The incorporators include Paul D. Durant, H. F. Friedrich and R. E. Pfeil.

MILWAUKEE.—The Modern Steel Treating Co. has been incorporated with $5000 capital to operate a new heat treating process by Adam J. Eimermann, G. Walter and others.

MILWAUKEE.—The Sommers & Sons Co., recently incorporated to manufacture tanks, will occupy the plant of the General Construction Co., Galena and Thirtieth streets, which will be remodeled and equipped.

MILWAUKEE.—Swift & Co., Chicago, have awarded a contract to Theo. Stark & Co., Cedar Rapids, Iowa, for erection of a 4-story concrete and brick addition to its Milwaukee refrigerating plant. The structure will be 50 x 60 feet and located at Second and Fowler streets.

MILWAUKEE.—To handle a large contract for furnishing reinforced concrete poles for the municipal street lighting system, the Universal Concrete Products Co., 208 South LaSalle street, Chicago, will erect a brick and frame shop, 80 x 486 feet, on Port Washington road here. J. E. Moody is chief engineer.

MILWAUKEE.—The building at 199 Oregon street, occupied by the Kieckhafer Mfg. Co., tool and die-maker, and the Chas. Jurack Pattern Works, has been damaged by fire with a loss of $5000.

OSHKOSH, WIS.—The Wisconsin Duplex Automobile Co., Clintonville, Wis., a $500,000 corporation, will establish a new plant and offices here. Plans will be prepared at once and the company hopes to be able to start manufacturing trucks by April 1.

RACINE, WIS.—The Thor Machine Works has been incorporated with $20,000 capital by K. H. Studt, Andrew Astrey and K. F. Jacobson.

RACINE, WIS.—A. A. Guilbert, architect, will close bids Jan. 2 for the erection of a brick and concrete warehouse, 60 x 104 feet, 4 stories and basement, for the J. I. Case Plow Works. The estimated cost is $50,000.

SHEBOYGAN, WIS.—The Badger State Tanning Co. will build a power house on South Water street. Juul & Sixta, 805 North Eighth street, are architects.

STEVENS POINT, WIS. — The Central City Iron Works, specializing in railroad malleable and gray iron castings, has been purchased by the Trenam Tractor Co., Milwaukee, a South Dakota corporation organized several months ago with $400,000 capital. The new owners of the foundry intend to continue the manufacture of castings. Some new equipment will be installed. F. M. Schuler is secretary and treasurer of the Trenam company.

DETROIT.—The Chevrolet Motor Co., 1244 Woodward avenue, plans to build a new factory and an addition to cost $100,000 and $300,000 respectively.

DETROIT.—The Detroit Range Boiler Co. has awarded the contract for a 1-story factory to be 75 x 173 feet in size, to W. N. Miller, 1303 Kresge building.

DETROIT. — Smith, Hinchman & Grylls, architects, 710 Washington Arcade, have prepared plans for a 5-story warehouse to be erected by Hudson & Symington.

GRAND RAPIDS, MICH. — The Safety Crank Co. has been organized to manufacture automobile cranks. G. H. Dickerson, DeForest W. Hamilton and Henry Reichel are interested.

GRAND RAPIDS, MICH.—The Haskelite Mfg. Co., Ludington, Mich., will remove its plant to this city. The company is capitalized at $1,000,000.

MARQUETTE, MICH. — The plant built for the Rainier Motor Car Co. and never occupied, will be opened by the General Motors Co. under the management of George H. Hannum.

TRAVERS CITY, MICH.—The Boardman River Light & Power Co. is planning a power plant and dam, to cost $200,000. The Fargo Engineering Co., Jackson, Mich., is engineer.

CHARLESTON, ILL.—The city plans to reconstruct its waterworks plant including the addition of a 2,000,000-gallon pump, boilers and low and high lift pumps at a cost of $13,000. J. A. Tremble is city engineer.

CHICAGO.—C. Quinlan, 124 South Green street, will build a 4-story factory for the manufacture of metal specialties, at a cost of $30,000.

CHICAGO.—The American Cutlery Co., 764 Mather street, has been incorporated with $310,000 capital by Isaac Hirsch, Moses Hirsch, Lawrence H. Howell and Milton S. Hirsch.

CHICAGO.—The Duro Metal Products Co. has been incorporated with $5000 capital. Albert N. Powell and Alfred W. Bays, 109 North Dearborn street, are among the incorporated.

CHICAGO.—The Art Metal Radiator Cov-

Revolving Crane Type Slab Chargers

Specialized machines have been one of the reasons for the great success of W-S-M equipment. Our Charging Machines are designed and built with a view to meeting local requirements—to utilize the available space most advantageously. Particular consideration is given to the general layout of the building, working conditions, service required, etc.

Let W-S-M engineers look over your plant when you are contemplating the installation of new steel making equipment of any kind. You will find they can save you money.

The Revolving Crane Type Slab Chargers pictured above were built by The W-S-M Company for the Youngstown Sheet and Tube Company, Youngstown, Ohio.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product
Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

er Co., 175 West Jackson boulevard, has been incorporated with $5000 capital by Edward Schleicher, Irene J. Schleicher and Frederick A. Siebold Jr.

CHICAGO. — Plans are being drawn by Alex L. Levy, architect, 111 West Washington street, for a 75 x 125-foot factory to cost $50,000. The owner's name is not disclosed.

CICERO, ILL.—The Cicero Tool Works has been chartered with a capital stock of $25,000. John Janis is interested.

EAST ST. LOUIS, ILL.—The Excelsior Tool & Machine Co. will build an addition to its foundry, to include a large core oven, and will install a 10-ton and a 2-ton electric crane. T. F. Philippi is general manager.

EDWARDSVILLE, ILL. — The Liberty Steel Co., recently incorporated with $1,000,000 capital, will build a plant. S. F. Lloyd is president.

ELGIN, ILL.—Woodruff & Edwards are having plans drawn for the rebuilding of their foundry and machine shop, recently damaged by fire. The new structure will be 3-story, 100 x 140 feet, and will cost $80,000.

MATTOON, ILL. — The Foundry Metal Works will build a foundry building to cost $50,000. The Clark Meter Co. owns the concern.

MAYWOOD, ILL.—The Universal Engineering Co., 700 West Twenty-second street, Chicago, will build a 1-story machine shop here, costing $15,000.

PEKIN, ILL.—The Edwards Cylinder Co., recently incorporated, will build a factory. C. R. Edwards, Mackinaw, Ill., is president.

PEORIA, ILL.—Plans are being drawn by Reeves & Baillie, architects, 221 South Jefferson street, for a tractor plant containing 13 buildings, to cost $175,000 for a company being organized by H. A. Rosenthal, 122 South Michigan avenue, Chicago.

ROCKFORD, ILL. — The J. G. Redmond Millwork Co. has been incorporated with $15,000 to manufacture planing mill machinery.

ANDERSON, IND.—The Continental File Co., 230 Union building, is building a 1-story factory. G. A. Lambert is manager.

ELKHART, IND.—The Peck's Super Heat Co. has been incorporated with $10,000 capital to manufacture automobile appliances. Raymond G. Peck, Carl E. Mischler and H. J. Rife are interested.

NEW CASTLE, IND.—The Davis Foundry Co. has been incorporated with $40,000 capital by John G. Hey, Louis B. Patterson and William Davis.

SOUTH BEND, IND.—The Singer Mfg. Co., 2215 West Division street, will build a 1-story addition to its foundry, to cost $15,000.

TERRE HAUTE, IND. — The Midland Electric Steel Co. has been organized to make electric steel castings. The incorporators include J. B. Moos, Chicago, president; W. C. Ely, Terre Haute, now head of the Highland Iron & Steel Co., treasurer, and W. K. Booth, of the Booth-Hall Co., Chicago, general manager.

VINCENNES, IND. — The Baltimore & Ohio railroad is having plans prepared for a freight station to cost $100,000. H. A. Lane, Baltimore, is chief engineer.

BRYAN, O.—The Ohio Art Metal Co., Defiance, O., has purchased a tract on which it proposes to erect a 5-story factory building.

CANAL DOVER, O. — The Reeves Mfg. Co., Lloyd Reeves, manager, plans to make extensive coal mine developments. The company will install machinery and equipment to cost $100,000. George Arnold, New Philadelphia, O., is engineer.

CANTON, O.—The Republic Rubber Corp., recently organized, has had plans prepared for a new plant to cost $500,000.

CANTON, O.—The Canton Machine Shop Co. has been incorporated with a capital of $50,000. Frank L. Decorpos and Ralph Staley are interested.

CINCINNATI.—Plans are being prepared by Harry Hake, architect, for a 2-story brick addition to the factory of the Andrew Jergens Co., Spring Grove avenue, 100 x 200 feet.

CINCINNATI.—The Greaves Machine Tool Co. has been chartered with a capital of $100,000. William A. Greaves and William A. Greaves Jr. are interested.

CINCINNATI. — The Oesterlein Machine Co., 2850 Spring Grove avenue, has purchased the plant of the Samuel C. Tatum Co., Colerain avenue and Monmouth street which it will equip for the manufacture of machine tools.

CINCINNATI.—The Samuel C. Tatum Co., Colerain avenue and Monmouth streets, which has disposed of its plant to the Oesterlein Machine Co., is reported to have plans under consideration for the erection of a new plant.

CLEVELAND.—The plant of the Sterling Spring Co., 2148 Scranton road, has been damaged by fire with a loss estimated at $15,000.

Western and Intermountain Territory

MINNEAPOLIS. — The Federal Steel & Mfg. Co. will build a 1-story machine shop 100 x 400 feet and a foundry 100 x 125 feet in size. F. D. McClure, 1117 Metropolitan Life building, is president.

MINNEAPOLIS.—The Gas Traction Foundry Co. will build a foundry 195 x 297 feet in size, to cost $75,000. O. W. Potter, 1907 Fourth street, is general sales manager.

ROCHESTER, MINN. — Plans are being prepared for a bridge to contain two 150-foot spans. A. F. Wright is city clerk.

ST. PAUL.—The city is preparing plans for a viaduct one mile long to cost $500,000.

ST. PAUL.—The Convertible Tractor Corp., 1485 Marshall avenue, will build a 4-story addition 50 x 115 feet.

ST. PAUL.—The St. Paul Foundry Co. has received a government contract to furnish steel ship plates and other fittings, which renders necessary the installation of new equipment and the enlargement of its plant. C. M. Power is president of the company, which has its offices at Como avenue and Mackubin street.

BURLINGTON, IOWA.—The Northwestern Stamping Co., Osborn street, is receiving bids for the erection of a 100 x 150-foot plant.

BUTLER, MO.—The plant of the Butler Rolling Mills has been damaged by fire with a loss estimated at $100,000. Cannon Bros. are owners.

KANSAS CITY, MO. — The Henry Weis Mfg. Co. has been incorporated with $50,000 capital under a New Jersey charter to manufacture metal specialties by Henry Weis, Robert Vance and T. H. Ridge.

ST. LOUIS.—The Truck, Tractor & Mfg. Co. has been chartered with $25,000 capital to manufacture motor vehicles. The incorporators include Isidor M. Jacobs, Kansas City, Mo., and Norris B. Gregg Jr., St. Louis.

FOREMAN, ARK.—The Portland Cement Co. will build a cement manufacturing plant. The Fuller Engineering Co., 1336 South Michigan avenue, Chicago, is in charge of construction.

FORT SMITH, ARK.—The Rex Stove Co. has been incorporated with $100,000 capital by W. J. Henry, T. G. Dade, and W. J. Echols.

LITTLE ROCK, ARK. — The Arkansas Foundry Co. has leased a plant at the foot of East Sixth street which it will equip for the manufacture of railroad and mill castings.

LITTLE ROCK, ARK.—The Arkansas Motor Truck Co. has been incorporated to manufacture industrial vehicles. The capital is $10,000 and incorporators include S. N. Bolton, H. C. Wilson and J. O. Evatt.

BEAUMONT, TEX.—The Beaumont Iron Works will install additional machinery, including electric transformers.

FORT WORTH, TEX.—The Oil Machine & Mfg. Co., recently incorporated with $50,000 capital, will build a plant. J. W. Carter is manager.

ADA, OKLA.—The Ada Iron Works will build a foundry for the manufacture of gray iron and brass castings and is in the market for a melting furnace. William Gilbert is manager.

HOMINY, OKLA.—The city commissioners contemplate the erection of an electric lighting plant and system. Address the mayor.

CENTER, NEBR.—Bids will be received until Jan. 24 by George W. Draper, clerk of Knox county, for a bridge over Verdigris river, including one 180-foot high-truss steel span.

GERING, NEBR.—Bids will be received until Jan. 21 by V. B. Kirkham, clerk of Scottsbluff county, for two bridges each containing twelve 50-foot reinforced concrete arches with 16-foot roadway.

McCOOK, NEBR.—Bids will be received until Jan. 28 by Barney Hofer, clerk of Red Willow county, for a reinforced concrete bridge containing six 50-foot spans.

NORTH PLATTE, NEBR.—Bids will be received until Jan. 22 by A. S. Allen, clerk of Lincoln county, for a reinforced concrete bridge, containing ten 50-foot arches.

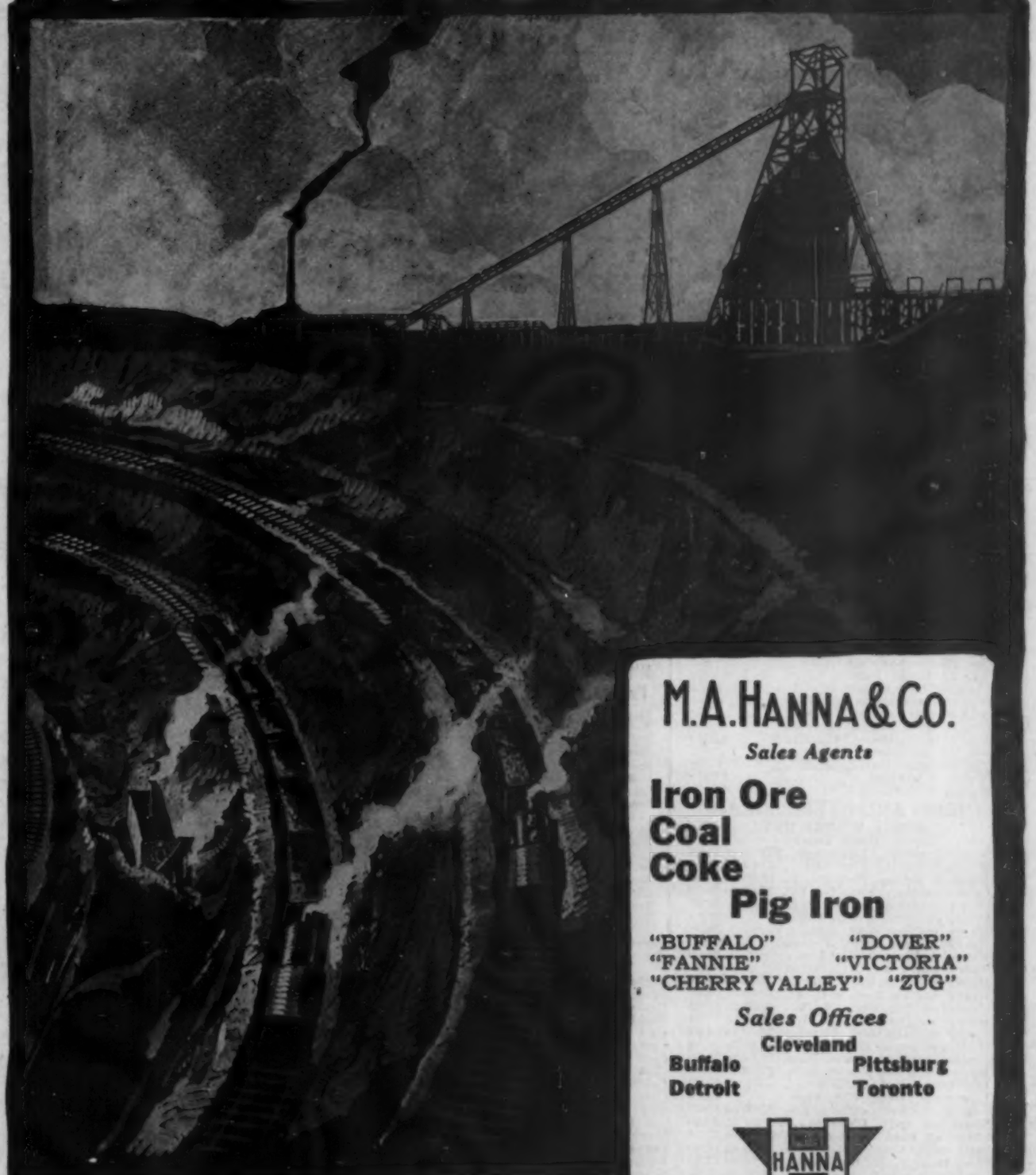
OMAHA, NEBR.—Andrew Murphy & Son will build a 3-story, 66 x 132-foot factory to cost $40,000. Plans are being drawn by John & Alan McDonald, architects, 905 Omaha National Bank building.

WEST POINT, NEBR.—Bids will be received until Jan. 23 by Rudolph Brazda, county clerk of Cummings county, for a 240-foot bridge.

BISMARCK, N. DAK.—The Dakota Sales Co. has been incorporated with $25,000 capital to manufacture grain cleaning machinery. C. Williams, C. C. Putnam, and H. L. Stegner are interested.

SHELLEY, IDAHO.—A municipal electric light plant is contemplated.

HANNA



M. A. HANNA & Co.

Sales Agents

Iron Ore
Coal
Coke
Pig Iron

"BUFFALO" "DOVER"
"FANNIE" "VICTORIA"
"CHERRY VALLEY" "ZUG"

Sales Offices

Cleveland
Buffalo **Pittsburg**
Detroit **Toronto**

HANNA

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.

Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

Port Henry Ores, non-Bessemer, Per Unit, Delivered Eastern Pennsylvania.

Old Bed, crude 55 iron	10.50c to 11.00c
Old Bed., concent., 65 iron	11.00c to 11.50c
Harmony, concent., 63 iron	11.50c to 11.75c
Lump (at mines)	$5.75c

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.35c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.35c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.60c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	22.00 to 22.50
Bundled sheets, Buffalo	19.00 to 20.00
City wrought, short, N. Y.	25.00 to 26.00
Frogs, switches, guards, St. L.	29.00 to 29.50
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	27.00 to 27.50
Heavy melting steel, east. Pa.	27.00 to 29.00
Heavy melting steel, N. Y.	26.00 to 26.50
Heavy melting steel, St. L.	28.50 to 29.00
Heavy melting steel, Birming.	23.00 to 24.00
Hydraulic press. sheets, Cleve.	25.00 to 25.50
Hydraulic press. sheets, Pitts.	24.00 to 25.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh	40.00
Low phos. steel, eastern Pa.	35.00 to 37.00
Shoveling steel, Chicago	30.00
Shoveling steel, St. Louis	26.50 to 27.00
Steel rails, short, Chicago	34.00 to 34.50
Steel rails, short, Cleveland	31.00 to 32.00
Steel rails, short, St. Louis	36.50 to 37.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati	16.50 to 17.00
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	19.50 to 20.00
Stove plate, Birmingham	19.50 to 21.50
Stove plate, Buffalo	22.00 to 23.00
Stove plate, eastern Pa.	22.00 to 23.00
Stove plate, Cleveland	19.00 to 20.00
Stove plate, Pittsburgh	20.00 to 21.00
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$21.00 to 22.00
Boiler plate, cut, No. 1, St. L.	21.00 to 21.50
Bundled sheets, Cincinnati	17.00 to 17.50
Knuckles, coup., Chicago	34.00 to 34.50
Knuckles, coup., St. Louis	31.50 to 32.00
Springs, Chicago	39.50 to 40.00
Stove plate, Chicago	21.00 to 22.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54

Buffalo to:

Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10

Virginia furnaces to:

Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52

Birmingham, Ala., to:

Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40

Chicago to:

Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58

Ironton and Jackson, O., to:

Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54

Duluth, Minn., to:

Minneapolis-St. Paul	$1.25

Mayville, Wis.:

Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:

New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	79.0 cents
St. Louis	27 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	75 cents
Pacific coast (tin plate)	75 cents

IRON MILL USE

(Gross Tons)

Busheling, No. 1, Cleveland	25.75 to 26.75
Busheling, No. 1, Buffalo	26.00 to 27.00
Busheling, No. 2, Buffalo	17.00 to 18.00
Busheling, No. 1, Pittsburgh	21.00 to 22.00
Cast borings, New York	16.50 to 17.00
Cast borings, eastern Pa.	19.00 to 20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	13.00 to 15.00
City wrought, long, N. Y.	31.00 to 32.00
Cut forge, Chicago	35.00
Forge flashings, small, Cleve.	24.50 to 25.50
Forge flashings, large, Cleve.	24.00 to 25.00
Forge No. 1, Eastern Pa.	22.50 to 23.50
Grate bars, Buffalo	20.00 to 21.00
Grate bars, Cleveland	20.00 to 21.00
Grate bars, N. J. points	19.50 to 20.00
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	42.00 to 42.50
Iron axles, Cleveland	49.50 to 50.00
Iron axles, eastern Pa.	50.00 to 55.00
Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	38.00 to 39.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.50 to 33.00
Iron rails, St. Louis	35.50 to 36.00
Iron rails, Cleveland	40.00 to 40.50
Machine turnings, Cleve.	20.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	18.50 to 19.50
Machine turnings, Birming.	17.00 to 18.00
Pipes and flues, Cleveland	23.75 to 24.75
R. R. mch. cast, No. 1, Buff.	30.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	35.00
R. R. wrgt. No. 1, Birming.	30.00 to 35.00
Wrought pipe, Buffalo	26.00 to 27.00
Wrought pipe, eastern Pa.	30.00 to 32.00
Wrought pipe, New York	30.00

(Net Tons)

Angle bars, iron, Chicago	$37.00 to 37.50
Angle bars, steel, St. Louis	26.50 to 27.00
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	37.50 to 38.50
Busheling, No. 1, Chicago	26.00 to 27.00
Busheling, No. 1, Cincinnati	21.00 to 21.50
Busheling, No. 1, St. Louis	24.50 to 25.00
Busheling, No. 2, Chicago	17.50 to 18.50
Cast borings, Cincinnati	13.00 to 13.50
Cast borings, St. Louis	16.00 to 16.50
Cast borings, Chicago	17.00 to 17.50
Iron axles, St. Louis	44.00 to 44.50
Iron axles, Chicago	47.00 to 48.00
Machine turnings, Chgo.	17.00 to 17.50
Machine turnings, Cinci.	13.00 to 13.50
Machine turnings, St. L.	16.75 to 17.25
Pipes and flues, Chicago	23.50 to 24.50
Pipes and flues, St. Louis	23.50 to 24.00
Railroad wrgt., No. 1, Cinci.	28.50 to 29.00
Railroad wrgt., No. 1, St. L.	31.00 to 31.50
Railroad wrgt., No. 2, St. L.	29.00 to 29.50

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$23.00 to 24.00
Axle turnings, Buffalo	26.50 to 27.00
Shafting, New York	34.00
Shafting, eastern Pa.	38.00 to 40.00
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	46.00 to 47.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	50.00 to 55.00
Steel car axles, Chgo.	47.50

(Net Tons)

Shafting, St. Louis	30.50 to 31.00
Steel car axles, St. Louis	42.50 to 43.00

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	$30.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	33.00 to 35.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	26.50 to 27.00
Tram car wheels, Birming.	21.00 to 25.00
Cast, No. 1, Birmingham	25.00 to 27.50
Cast, 1, machy., N. J. points	32.00 to 33.00
Cast No. 1, Cleveland	27.75 to 28.00
Cast, 1, heavy, N. J. points	30.00
Cast, No. 1, eastern Pa.	31.00 to 33.00
Cast No. 1 Chgo.	30.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	21.50 to 22.50
Malleable railroad, Cleveland	27.00 to 27.50
Malleable railroad, Buffalo	30.00
Malleable railroad, Pittsburgh	30.00
Malleable railroad, east. Pa.	30.00 to 32.00
Malleable railroad Chgo.	30.00
Malleable, agricultural, Chgo.	30.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	24.50 to 25.00
Malleable railroad, St. Louis	25.00 to 26.00
Malleable agricultural, Chgo.	24.00 to 25.00
Malleable agricultural, St. L.	23.50 to 24.00

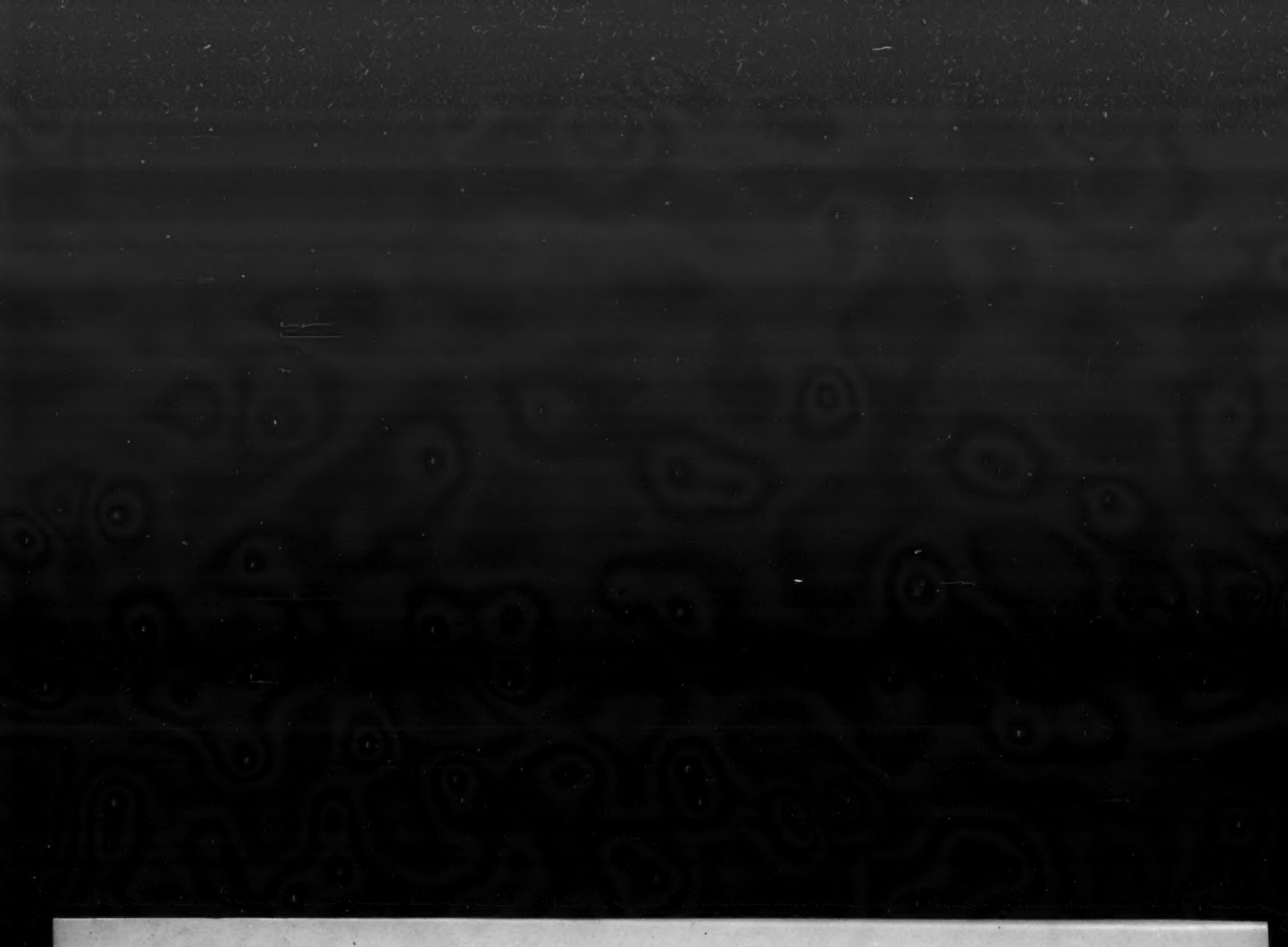
MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	37.00 to 40.00
Reroll. rails, 5 ft. & ov., St. L.	35.50 to 36.00
Reroll. rails, 5 ft. or ov., Cleve.	37.00 to 38.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.	47.50

(Net Tons)

Boiler punchings, Chicago	31.50 to 32.00
Locomotive tires, St. Louis	33.50 to 34.00



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MAYWOOD, ILL.—The Universal Engineering Co., 700 West Twenty-second street, Chicago, will build a 1-story machine shop here, costing $15,000.

PEKIN, ILL.—The Edwards Cylinder Co., recently incorporated, will build a factory. C. R. Edwards, Mackinaw, Ill., is president.

PEORIA, ILL.—Plans are being drawn by Reeves & Baillie, architects, 221 South Jefferson street, for a tractor plant containing 13 buildings, to cost $175,000 for a company being organized by H. A. Rosenthal, 122 South Michigan avenue, Chicago.

ROCKFORD, ILL. — The J. G. Redmond Millwork Co. has been incorporated with $15,000 to manufacture planing mill machinery.

ANDERSON, IND.—The Continental File Co., 230 Union building, is building a 1-story factory. G A. Lambert is manager.

ELKHART, IND.—The Peck's Super Heat Co. has been incorporated with $10,000 capital to manufacture automobile appliances. Raymond G. Peck, Carl E. Mischler and H. J. Rife are interested.

NEW CASTLE, IND.—The Davis Foundry Co. has been incorporated with $40,000 capital by John G. Hey, Louis B. Patterson and William Davis.

SOUTH BEND, IND.—The Singer Mfg. Co., 2215 West Division street, will build a 1-story addition to its foundry, to cost $15,000.

TERRE HAUTE, IND. — The Midland Electric Steel Co. has been organized to make electric steel castings. The incorporators include J. B. Moos, Chicago, president; W. C. Ely, Terre Haute, now head of the Highland Iron & Steel Co., treasurer, and W. K. Booth, of the Booth-Hall Co., Chicago, general manager.

VINCENNES, IND. — The Baltimore & Ohio railroad is having plans prepared for a freight station to cost $100,000. H. A. Lane, Baltimore, is chief engineer.

BRYAN, O.—The Ohio Art Metal Co., Defiance, O., has purchased a tract on which it proposes to erect a 5-story factory building.

CANAL DOVER, O. — The Reeves Mfg. Co., Lloyd Reeves, manager, plans to make extensive coal mine developments. The company will install machinery and equipment to cost $100,000. George Arnold, New Philadelphia, O., is engineer.

CANTON, O.—The Republic Rubber Corp., recently organized, has had plans prepared for a new plant to cost $500,000.

CANTON, O.—The Canton Machine Shop Co. has been incorporated with a capital of $50,000. Frank L. Decorpos and Ralph Staley are interested.

CINCINNATI.—Plans are being prepared by Harry Hake, architect, for a 2-story brick addition to the factory of the Andrew Jergens Co., Spring Grove avenue, 100 x 200 feet.

CINCINNATI.—The Greaves Machine Tool Co. has been chartered with a capital of $100,000. William A. Greaves and William A. Greaves Jr. are interested.

CINCINNATI. — The Oesterlein Machine Co., 2850 Spring Grove avenue, has purchased the plant of the Samuel C. Tatum Co., Colerain avenue and Monmouth street which it will equip for the manufacture of machine tools.

CINCINNATI.—The Samuel C. Tatum Co., Colerain avenue and Monmouth streets, which has disposed of its plant to the Oesterlein Machine Co., is reported to have plans under consideration for the erection of a new plant.

CLEVELAND.—The plant of the Sterling Spring Co., 2148 Scranton road, has been damaged by fire with a loss estimated at $15,000.

Western and Intermountain Territory

MINNEAPOLIS. — The Federal Steel & Mfg. Co. will build a 1-story machine shop 100 x 400 feet and a foundry 100 x 125 feet in size. F. D. McClure, 1117 Metropolitan Life building, is president.

MINNEAPOLIS.—The Gas Traction Foundry Co. will build a foundry 195 x 297 feet in size, to cost $75,000. O. W. Potter, 1907 Fourth street, is general sales manager.

ROCHESTER, MINN. — Plans are being prepared for a bridge to contain two 150-foot spans. A. F. Wright is city clerk.

ST. PAUL.—The city is preparing plans for a viaduct one mile long to cost $500,000.

ST. PAUL.—The Convertible Tractor Corp., 1485 Marshall avenue, will build a 4-story addition 50 x 115 feet.

ST. PAUL.—The St. Paul Foundry Co. has received a government contract to furnish steel ship plates and other fittings, which renders necessary the installation of new equipment and the enlargement of its plant. C. M. Power is president of the company, which has its offices at Como avenue and Mackubin street.

BURLINGTON, IOWA.—The Northwestern Stamping Co., Osborn street, is receiving bids for the erection of a 100 x 150-foot plant.

BUTLER, MO.—The plant of the Butler Rolling Mills has been damaged by fire with a loss estimated at $100,000. Cannon Bros. are owners.

KANSAS CITY, MO. — The Henry Weis Mfg. Co. has been incorporated with $50,000 capital under a New Jersey charter to manufacture metal specialties by Henry Weis, Robert Vance and T. H. Ridge.

ST. LOUIS.—The Truck, Tractor & Mfg. Co. has been chartered with $25,000 capital to manufacture motor vehicles. The incorporators include Isidor M. Jacobs, Kansas City, Mo., and Norris B. Gregg Jr., St. Louis.

FOREMAN, ARK.—The Portland Cement Co. will build a cement manufacturing plant. The Fuller Engineering Co., 1336 South Michigan avenue, Chicago, is in charge of construction.

FORT SMITH, ARK.—The Rex Stove Co. has been incorporated with $100,000 capital by W. J. Henry, T. G. Dade, and W. J. Echols.

LITTLE ROCK, ARK. — The Arkansas Foundry Co. has leased a plant at the foot of East Sixth street which it will equip for the manufacture of railroad and mill castings.

LITTLE ROCK, ARK.—The Arkansas Motor Truck Co. has been incorporated to manufacture industrial vehicles. The capital is $10,000 and incorporators include S. N. Bolton, H. C. Wilson and J. O. Evatt.

BEAUMONT, TEX.—The Beaumont Iron Works will install additional machinery, including electric transformers.

FORT WORTH, TEX.—The Oil Machine & Mfg. Co., recently incorporated with $50,000 capital, will build a plant. J. W. Carter is manager.

ADA, OKLA.—The Ada Iron Works will build a foundry for the manufacture of gray iron and brass castings and is in the market for a melting furnace. William Gilbert is manager.

HOMINY, OKLA.—The city commissioners contemplate the erection of an electric lighting plant and system. Address the mayor.

CENTER, NEBR.—Bids will be received until Jan. 24 by George W. Draper, clerk of Knox county, for a bridge over Verdigris river, including one 180-foot high-truss steel span.

GERING, NEBR.—Bids will be received until Jan. 21 by V. B. Kirkham, clerk of Scottsbluff county, for two bridges each containing twelve 50-foot reinforced concrete arches with 16-foot roadway.

McCOOK, NEBR.—Bids will be received until Jan. 28 by Barney Hofer, clerk of Red Willow county, for a reinforced concrete bridge containing six 50-foot spans.

NORTH PLATTE, NEBR.—Bids will be received until Jan. 22 by A. S. Allen, clerk of Lincoln county, for a reinforced concrete bridge, containing ten 50-foot arches.

OMAHA, NEBR.—Andrew Murphy & Son will build a 3-story, 66 x 132-foot factory to cost $40,000. Plans are being drawn by John & Alan McDonald, architects, 905 Omaha National Bank building.

WEST POINT, NEBR.—Bids will be received until Jan. 23 by Rudolph Brazda, county clerk of Cummings county, for a 240-foot bridge.

BISMARCK, N. DAK.—The Dakota Sales Co. has been incorporated with $25,000 capital to manufacture grain cleaning machinery. C. Williams, C. C. Putnam, and H. L. Stegner are interested.

SHELLEY, IDAHO.—A municipal electric light plant is contemplated.